THE CITY
AS A SYSTEM

PROCEEDINGS

BOSTON ARCHITECTURAL CENTER WORKSHOP SERIES

ON ENVIRONMENTAL DESIGN

FOR DECISION-MAKERS IN GOVERNMENT,

1967-68, BOSTON, MASSACHUSETTS

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INTRODUCTION

Decision-making and architectural review in the changing urban environment is often relegated to administrative and engineering personnel in government agencies who have backgrounds in disciplines other than the design professions, and who are familiar with concepts and techniques for implementation in areas other than urban design. A host of individuals in a great variety of government departments on all levels make both small and large decisions every day which affect some aspect of urban life in a crucial way. At best their decisions can work to shape the urban environment into forms compatible with the requirements of the modern city and its inhabitants, or at worst perpetuate already difficult problems. Sometimes agencies have vested interests in continuing already existing programs, and frequently it is difficult for personnel to see beyond the demands of their own agencies and areas of responsibility, and the effects of their decisions upon the whole. It is particularly to this last problem that our workshops shall address themselves.

Our most often repeated objective has been to develop an awareness on the part of decision makers to each other's problems and the interrelatedness of the parts. This is the meaning which underlies the title of our program, "The City as a System."

Each workshop consisted of approximately three one-hour sessions: the first part was a lecture presentation; in the second, the participants broke up to form small discussion groups; and in the third part, all groups came together again for a plenary session.

In planning the program for each meeting, we attempted to find a speaker who is both a prestigious practitioner in the field of environmental design and who presented a project which provided a good case study. This was offered for the reaction of the group, for their criticism as well as their evaluation. It was not our intention to forward any special point of view, but rather to create a climate for a candid discussion of views and ideas.

The Boston Architectural Center is endowed by the contributed services of many individuals, but it was especially fortunate in having Herbert Glassman as Chairman of an Advisory Committee consisting of Herbert Bogen, Hermann Field and David Wallace. The Advisory Committee spent many hours of hard work in planning and developing the program for the entire series as well as the all-day conference on the John Hancock Building, the transcript of which is to be found in a separate publication.

This publication is also due in great part to both the editorial as well as secretarial skills of Pat Wells.

Sanford R. Greenfield, AIA
Director of Education, BAC

PROGRAM

Nov. 7, 1967	THE CITY AS A SYSTEM Donald F. Blumberg Consultant in Operations Research & Long Range Planning
Dec. 5	URBAN PHYSICAL STRUCTURE AND SYMBOLIC FORM Herbert Bogen, AIA, AIP
Jan. 9, 1968	TRANSPORTATION SYSTEMS Aaron Fleisher, Professor Dept. of City & Regional Planning M.I.T.
Feb. 6, 1968	THE MULTI-LEVEL CITY CENTRE Vincent Ponte, Architect and City Planner, Montreal, Canada Critique: Robert Goodman Assistant Professor School of Architecture, M.I.T.
Mar. 5, 1968	AN ECOLOGICAL BASIS FOR PLANNING Ian McHarg, Chairman Dept. of Landscape Architecture & Regional Planning University of Pennsylvania Critique: Richard S. Bolan Institute for Human Sciences Boston College
Apr. 2, 1968	ROLE PLAYING Group leaders: Dr. Donald Kennedy Asst. Professor of Preventive Medicine (Cultural Anthropology) Tufts University; Dr. Bernard Kramer Associate Professor of Preventive Medicine, Tufts University
May 4, 1968	THE NEW JOHN HANCOCK BUILDING: An Example of Public & Private Decision-Making (all-day conference) (The proceedings for this Conference are in a separate publication.)

THE CITY AS A SYSTEM

The first workshop in a series on "Environmental Design for Decision-Makers in Government" convened in the Boston Architectural Center, 320 Newbury Street, Boston, Massachusetts November 7, 1967, at 2:20 p.m. The subject, "The City as a System". Principal speaker, Donald F. Blumberg. Mr. Herbert Glassman, Chairman, presiding.

MR. GREENFIELD: I would like to introduce David Wallace. He is a partner in the firm of Geometrics, a firm I guess best known to date for designing the dome at Expo '67. Dave is a consultant to the Metropolitan Area Planning Council and has done a great deal of comprehensive planning in many small communities, but most important, he is an old friend and has been very helpful in the formulation of this whole program. Dave? (Applause.)

MR. WALLACE: Thank you, Sandy. Donald F. Blumberg has ten year's experience in general management as a consultant in operations research and systems analysis, engineering and marketing, serving industry, government and the military. He has an interdisciplinary education which includes a Bachelor of Science in electrical engineering from the University of Pennsylvania; a Master of Business Administration from that same school for which he majored in industrial management and operations research and a Doctorate in applied economics also from the University of Pennsylvania.

Mr. Blumberg is presently Manager of the Operations Research and Management Systems Group of the WOFAC Corporation in Morristown, New Jersey.*

Among other things this corporation has developed an operations research approach for systems for planning urban and social change. For this he worked as Manager of Operations Research in long-range planning activity for Philco-Ford Corporation in Fort Washington, Pennsylvania, directing operations research and general management, consulting in various locations in the United States, Europe, Africa, and Southeast Asia.

Under his direction a significant new breakthrough was achieved in regional planning and analysis employing advanced simulation models and information retrieval techniques, a system which is now being applied by the Office of Economic Opportunity.

He was also responsible for development of new techniques to study logistics and maintenance support of any system or equipment in the field.

Prior to his experience at Philco-Ford he was Director of the Planning and Information Systems Division for Pennsylvania Research Associates, Inc., out of Philadelphia; and he was also a member of the faculty of the University of Pennsylvania.

Mr. Blumberg will give the keynote address on "The City as a System". It is with pleasure that I present to you Donald Blumberg. (Applause.)

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* Since this workshop session, Mr. Blumberg has become Vice President for Industrial Systems and Services Communications and Systems, Inc., Falls Church, Virginia.

MR. BLUMBERG: Thank you very much, Dave.

For people in decision-making or planning capacities, dealing with real problems in real cities, the concept of a city-system deserves some discussion. Is it really essential to deal with the city as a system? In order to fully understand the value of the concept, we must first define the types of functions or environmental elements which exist in an urban area.

The most familiar is the view of the city as a land use sub-system, a series of physical structures making up the core and the outlying regions, and representing the place where people live and work. (See Figure 1) We could also think of functioning elements of the city in terms of the social and economic environment. (See Figure 2) In this particular view we are looking not so much at the physical structures, but at the people; how they live; where they receive their economic gain, their health characteristics, their patterns; juvenile delinquency; education; race; and so forth. Emphasis is primarily on the living population.

A third view which could be taken of the city is the transportation environment's elements which move things and people from one place to another. The rail, road, and the air nets operate within the core of the urban area and connect this particular urban area with all others. (See Figure 3) Lastly, one can view the city in terms of its services: the water, the sewage system, the electric utilities, the hospitals, and the variety of other facilities which support the urban area. (See Figure 4)

As a matter of fact, these four separate "slices" or environmental elements represent, in general, the way that many people have been looking at our urban areas or cities, as slices rather than as integrated wholes. The thesis which we will propose and the techniques that we will discuss, deal with how to bring these four classes of sub-systems or sub-environments together into one overall structure - the city viewed as a system.

However, we must also discuss the dynamically changing structure of the city. The basic problem in the city is not just the four individual slices as discussed above, but the problem of dynamic change. (See Figure 5) The planning and the decision-making in each of these four classes of problem areas: the physical, the social and economic, the transportation, and the service nets, all vary in time. In summary, we view the four environmental groups interacting with each other and in time, as the city system. In looking at a variety of large urban areas, we found that a basic problem was the inability of decision-makers and decision-making mechanisms to come to grips with these interacting factors and their dynamic change. In essence,they were unable to deal with the entire problem because their focus was on elements of the city system, rather than on the city-system as a whole.

To give some feeling for the complexity and scope of this planning gap in the city system, it is of interest to list the types of planners that are normally to be found in an urban area. (See Figure 6) The focus of these classes of planners; their horizons of interest; and their emphasis on how long a delay occurs before an action takes place, and how long after that planned action some type of reaction will result within the urban area, can all be examined.

At the first level is the city planner or the architect-engineer with emphasis on land use and population growth. He has a planning horizon of some 30 to 40 years, and with a general feeling about reaction time in terms of construction starts, at least a five-year or greater time period. Next we have the transportation engineer, whose emphasis is primarily on the existing transportation, the networks, and the demand for transportation. He has a slightly different planning horizon and slightly different feeling about how long actions should take. The facilities planner has again a different focus.

In most urban areas in the United States, there are also the market planners - people who are employed by large retail or wholesale organizations, or who are acting as consultants, whose emphasis is on the population growth and market demand. They have a shorter planning horizon; and their action and reaction time concerning, for example, the initiation of a new supermarket or retail store, is on a different time frame than that of other types of planners. Market planners working in construction or investment fields also have a slightly different focus.

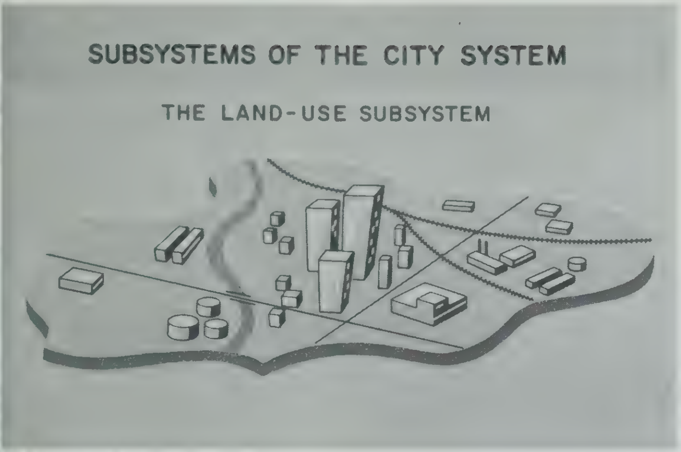

SUBSYSTEMS OF THE CITY SYSTEM
THE LAND-USE SUBSYSTEM

Figure 1

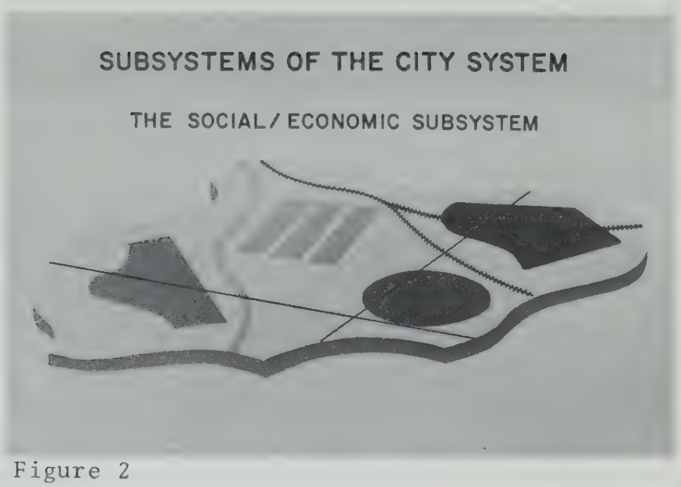


Figure 2

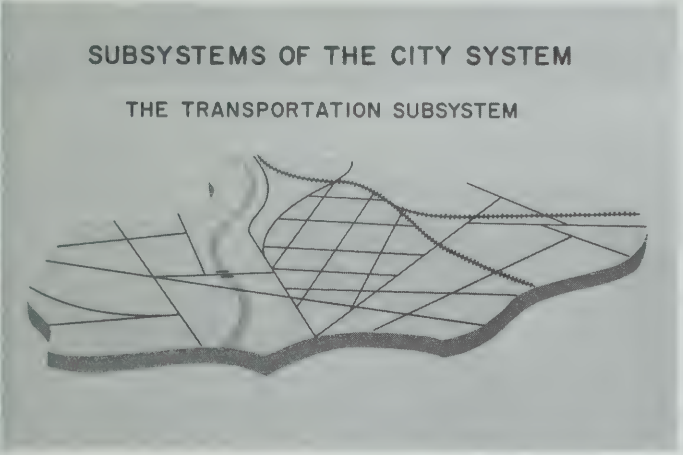


Figure 3

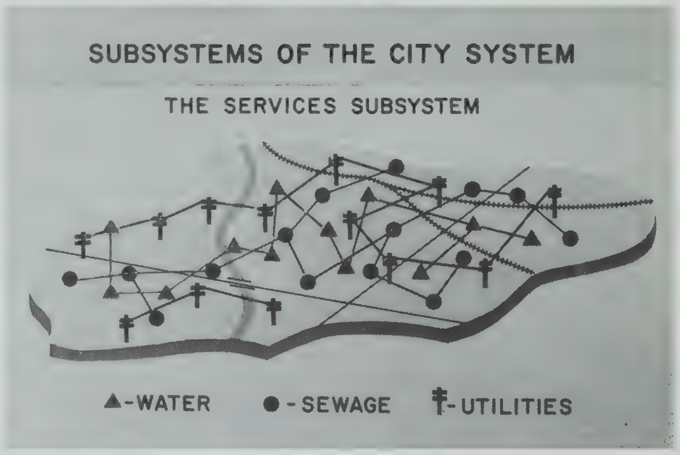


Figure 4

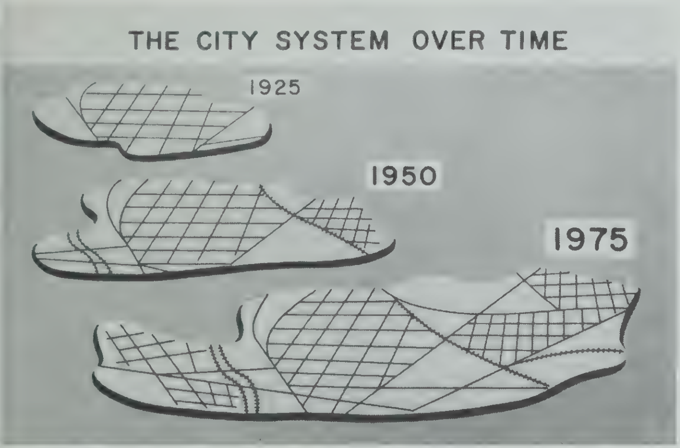

THE CITY SYSTEM OVER TIME
1925
1950
1975

Figure 5

FIGURE 6 THE CITY SYSTEM AS VIEWED BY CLASSES OF PLANNERS

PLANNING EMPHASIS	PRIMARY FOCUS	TYPICAL PLANNING HORIZON	TYP. PLANNED ACT./REACT. TIME
City Planner (A/E)	. Land Use . Population Growth . Construction Starts . Architectural Character	30-40 Years	5 Years
Transportation Engineer	. Existing Transportation Networks . Future Demand for Transportation (Land Use) & Population Growth . New Transportation Technology	25-50 Years	3 - 5 Years
Facilities Planner (Water, Sewage, & Utilities)	. Existing Networks . Future Demand-Based on Land Use & Population Growth . New Technology	10-25 Years	3 - 5 Years
Market Planners (Retail, Wholesale, & Services)	. Population Growth . Market Demand . Population Character Style - Emphasis on Purchasing Power . Competitive Organizations	1-3 Years	1-2 Years
Market Planners (Construction; Investment)	. Land Use/Value . Construction Starts . Occupancy Rates . Interest Rates	1-10 Years	1-2 Years
Political Planner	. Population by District . Population Style & Character . Legislative Requirements	4-8 Years	2-4 Years
Educational Planner	. Population Growth & Shift . Existing Educational Facilities . New Facilities Requirements . New Technology	1-5 Years	1-3 Years
Health, Welfare, & Social Services Planner	. Population Growth & Shift . Character & Style of Population . Existing Facilities . New Demands	1-10 Years	2-5 Years
Police & Enforcement Agency Planner	. Crime Rate by Area . Force Allocation . Population Shift	1-3 Years	0.1 - 1 Year

Educational planners and educators again have a different focus, as do the health, welfare, and social service planners, as well as the planning elements of police and enforcement agencies.

Each of these classes of planners in the city system is working for a decision-maker on a continuing basis. Each of these independent organizations is making decisions and taking actions which affect the urban area over time. If possible, it would be desirable to examine the actions taken by each of these planners, in turn, and define their mutual effects on the framework, structure, and type of the urban area or city system. We would like to have a methodology which would enable us to capture all these various outlooks, the dynamism which exists, and inter-laying of sub-systems to deal with the city as an integrated system.

City systems contain many interacting elements which are affected by randomness and unpredictability. These elements include activities which have extensive time lags; they involve very complex policies, rules, and procedures; they continually create a host of data; they involve many conflicting objectives; and they embody many component organizations. Lastly, the city system is impacted by and will have an impact on the local systems which are part of the urban area, the regional systems in which the urban area resides, and the larger national system.

We have been using the term "systems" to deal with the urban area or city. We can draw upon the same systems approach to assist in planning for urban and social changes in the "city system". Up to this point, we have been talking in a theoretical framework about the city system. Let us get a little more specific. About two years ago we began to look at the process of planning as described by these nine classes of planners, discussed previously, in several separate cities. These cities were selected because they represented a geographical dispersion; they represented areas in which, to some extent, sophisticated planning was being attempted.

We went into each of these cities; talked to city planners; examined their problems; and tried to make an estimate of the degree to which improved or more advanced techniques for planning could have improved the situation, or could have helped achieve a better goal. With few exceptions, we found that improvements could have been significant.

With this challenge in mind, we began to explore the idea of developing more sophisticated techniques to improve the planning and decision-making process in city systems. There has been a significant amount of work done over the last 50 years in development of analytical techniques for planning and analysis. In urban areas, a considerable amount of work has been done in the area of statistical analysis, using multi-variant factor analysis, components, and cluster analysis. Within the last 20 or 30 years, a considerable amount of work has also been done in the fields of economic and demographic analysis, and in the use of inter-industry and input/output trade area analysis and housing-demand models. Within the few years, land use models and Markov-type prediction models have been successfully developed. In the same time span, a considerable amount of work has been done in the area of simulation techniques as applied to city planning. Three interesting simulation-type forecasting systems have been constructed within the last five years.

In the 1950's, the states of Pennsylvania and New Jersey banded together, forming a special compact to study the requirements for new transportation facilities and capabilities in the Delaware Valley area. In the effort, a supporting program, known as the Penn-Jersey Transportation Study, began to use some of these advanced techniques. The Penn-Jersey Study team began to develop a computer-based simulation model, called a regional growth model, which would allow them to forecast the future in terms of new highway facilities initiated in the Delaware Valley area. The model was designed to study the question, "Why do people make use of transportation, and what is the effect on initiating new transportation facilities?"

About the same time, in Pittsburgh, under urban renewal grants from the Federal government, another team began to develop an approach to planning the Golden Triangle. Supported by the University of Pittsburgh's professors and other authoritative consultants, they developed a computer-based simulation to study what happens when people live in an area, i.e. how much secondary industry is developed, and what happens as the area population fluctuates. The first model was oriented more to the physical facilities, the transportation system. The second model was oriented to the people living in the area, the social and economic sub-system.

San Francisco, at approximately the same time and also supported by Federal government funds, employed a management consulting firm to develop a computer simulation to model the physical characteristics of the housing in the area. This simulation attempted to deal with the question of what would happen if housing characteristics in the San Francisco area were affected by changes in housing codes, and to estimate the impact of that type of decision. This third class of models was oriented to the land-use elements of the city system.

We looked at these three classes of models and felt enough had been done to enable us to take a first step toward developing a new set of models aimed at describing the city system as a whole. The system developed (Figure 7) was designed to describe a community, an urban area, at some point in time. The models were designed to work on a time increment basis, considering the changes that will occur in an urban area over time.

One initial class of inputs was data over a two-year period, describing the city system at a point in time. A second class of inputs was exogenous data, which described the style and character of the particular urban area. The model was developed to be of general use for any major urban area in the United States, and the exogenous data tried to describe the difference between this particular city system and another. These were the inputs to the "community model." The outputs from the community model were predictions of dynamic changes in the city system over time. These were printed out directly by a computer or stored in a data bank and later extracted.

The other portion of the system was designed to take as inputs, programs and attributes of programs to be initiated; the characterization of the government organization; and other social and political agencies which existed within the community. These inputs were then used to consider the effects a policy change or policy implementation would have on the city system. This could be done by superimposing the policy model on the community model to provide outputs concerning comparisons of different programs and to provide other analytical data concerning the impact of these programs.

The community model consists of a series of smaller models. The first of these was a small area sub-model. The small area sub-model was an attempt to describe a neighborhood in detail. It gave an account of the manner in which people live, such as secondary employment generated as a result of their living in that area, and their general social and economic patterns over a time period. The outputs from the small neighborhood area model are the inputs to an area sub-model, which describes in more physical terms what takes place in the community as a whole. The outputs from this model are the inputs to an individual sub-model, which relates what happens to an aggregate class of individuals within the urban area in terms of births, aging, deaths, education, etc. The outputs of that model, in turn, become inputs to a household model, which determines what the household incomes are, where these households reside, etc. Finally, the outputs of that model then become, in the next time frame, the inputs to the small area sub-model. This begins the next cycle, and the system continues on in that manner.

It would take a great deal of time to describe, in detail, how each of these models are basically made up of a series of equations, both logical and mathematical, based primarily on transition probabilities. For example, if there are 100 people at age 20 in a community in 1962; then based on the given birth and death probabilities, in 1963 there should be, at age 21, some percentage of these 100 people who existed in the previous year.

A series of such equations in the community model were used to delineate these transition effects in the areas of housing, employment, education, health, and welfare. The outputs of these predictions form the inputs to an urban area-wide forecast, which, in turn is used to calculate how many people are employed within the city and region supporting the city. These outputs are then applied to arrive at the number of people employed in each neighborhood. In turn, these estimates are utilized to obtain numbers on each population group by age, race, and employment in each small area.

These statistics, then, become the basis for an estimate of the occupations that are available or being filled, and as a means to obtain the numbers of households by race and sex. Finally, these figures are used to estimate family income, first by family, then by neighborhood. These inputs are used in the next time period as the setting points for these equations.

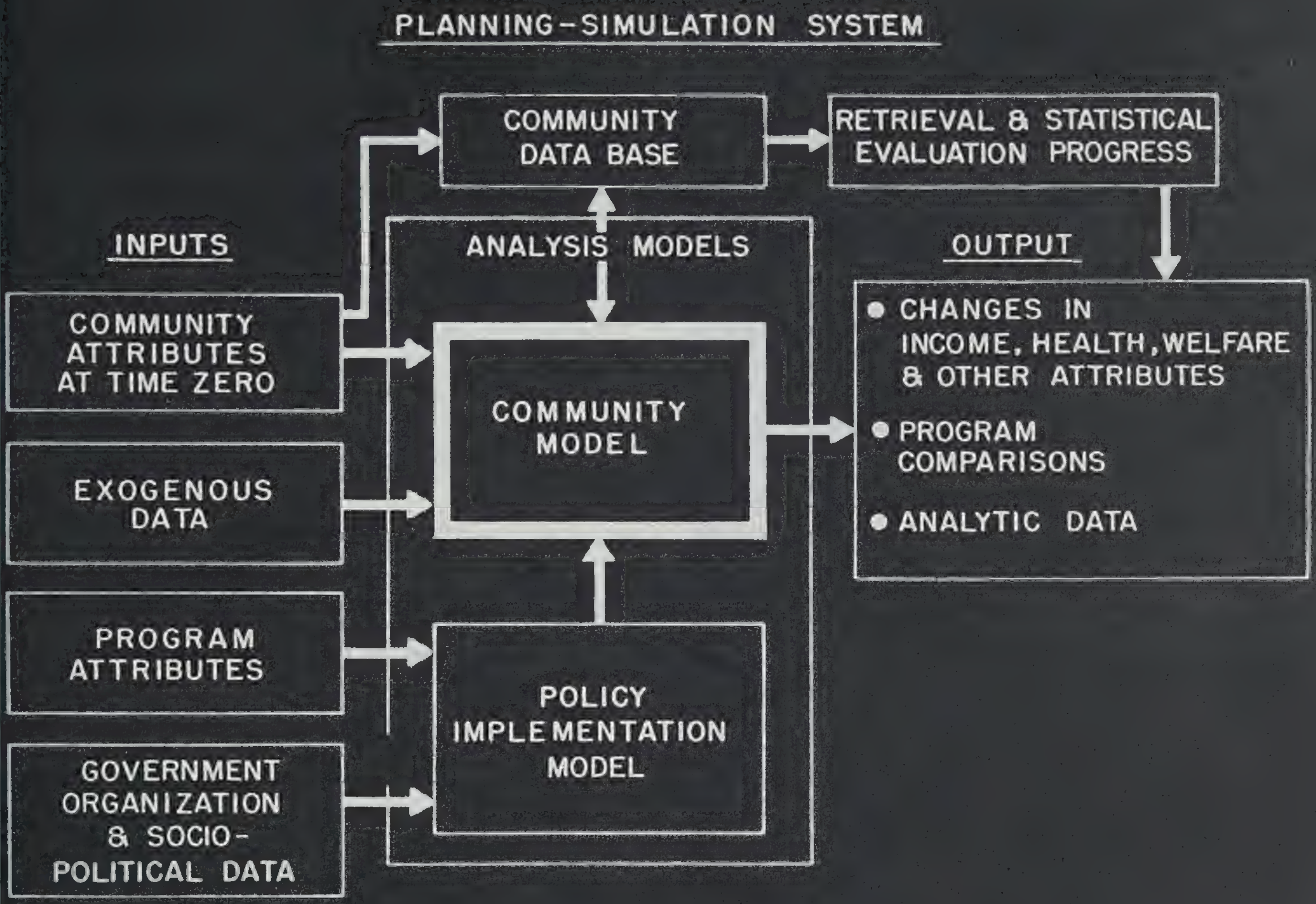

PLANNING-SIMULATION SYSTEM
COMMUNITY DATA BASE
RETRIEVAL & STATISTICAL EVALUATION PROGRESS
INPUTS
ANALYSIS MODELS
OUTPUT
COMMUNITY ATTRIBUTES AT TIME ZERO
EXOGENOUS DATA
PROGRAM ATTRIBUTES
GOVERNMENT ORGANIZATION & SOCIO-POLITICAL DATA
COMMUNITY MODEL
POLICY IMPLEMENTATION MODEL
● CHANGES IN INCOME, HEALTH, WELFARE & OTHER ATTRIBUTES
● PROGRAM COMPARISONS
● ANALYTIC DATA

Figure 7

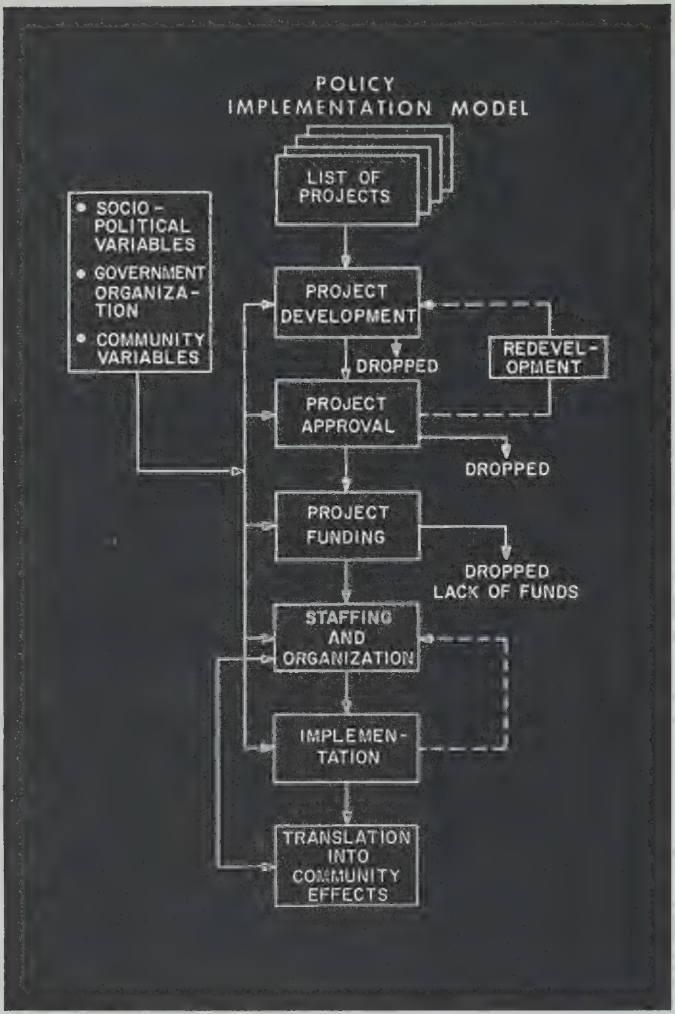


Figure 8

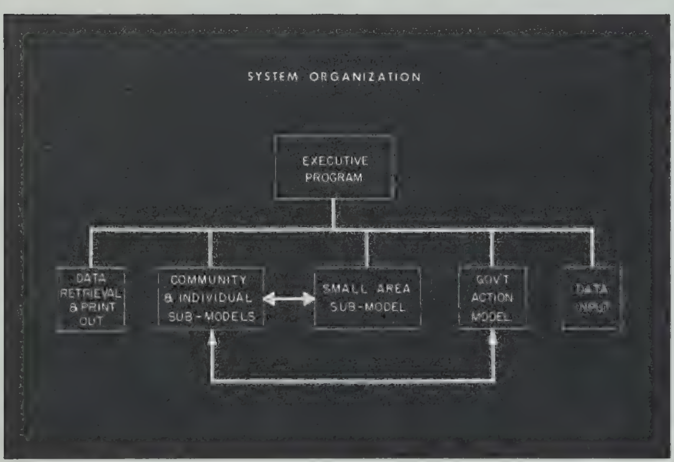


Figure 9

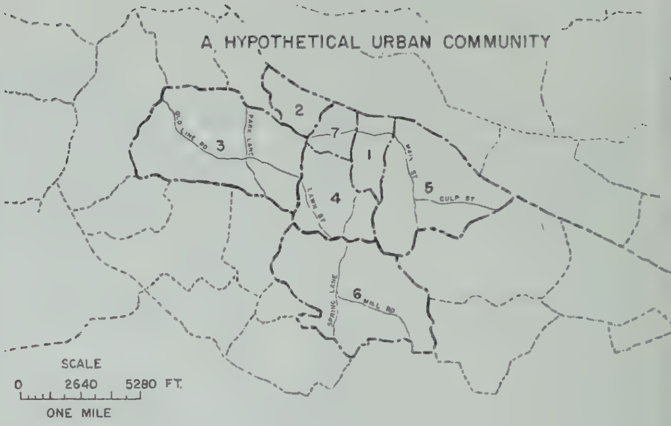
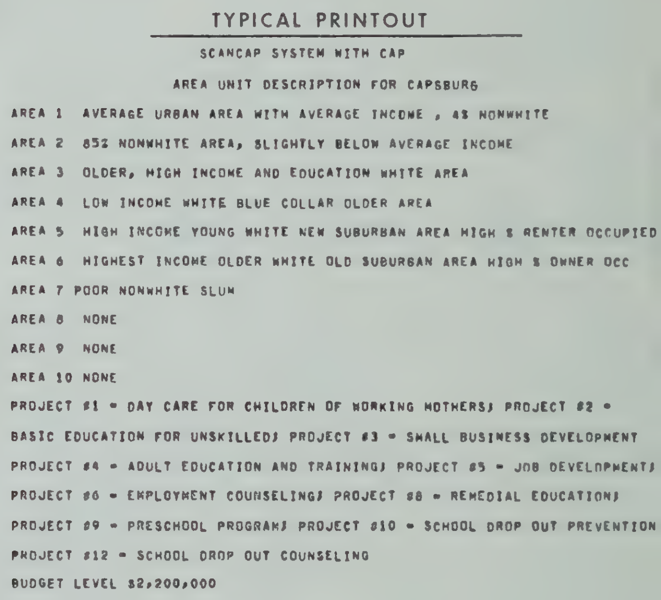


Figure 11


TYPICAL PRINTOUT

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                 SCANCAP SYSTEM WITH CAP

              AREA UNIT DESCRIPTION FOR CAPSBURG

AREA 1  AVERAGE URBAN AREA WITH AVERAGE INCOME , 4% NONWHITE

AREA 2  85% NONWHITE AREA, SLIGHTLY BELOW AVERAGE INCOME

AREA 3  OLDER, HIGH INCOME AND EDUCATION WHITE AREA

AREA 4  LOW INCOME WHITE BLUE COLLAR OLDER AREA

AREA 5  HIGH INCOME YOUNG WHITE NEW SUBURBAN AREA HIGH % RENTER OCCUPIED

AREA 6  HIGHEST INCOME OLDER WHITE OLD SUBURBAN AREA HIGH % OWNER OCC

AREA 7 POOR NONWHITE SLUM

AREA 8  NONE

AREA 9  NONE

AREA 10 NONE

PROJECT #1 - DAY CARE FOR CHILDREN OF WORKING MOTHERS; PROJECT #2 -

BASIC EDUCATION FOR UNSKILLED; PROJECT #3 - SMALL BUSINESS DEVELOPMENT

PROJECT #4 - ADULT EDUCATION AND TRAINING; PROJECT #5 - JOB DEVELOPMENT;

PROJECT #6 - EMPLOYMENT COUNSELING; PROJECT #8 - REMEDIAL EDUCATION;

PROJECT #9 - PRESCHOOL PROGRAM; PROJECT #10 - SCHOOL DROP OUT PREVENTION

PROJECT #12 - SCHOOL DROP OUT COUNSELING

BUDGET LEVEL $2,200,000
```

Figure 10 (a)

The "policy model" (See Figure 8) is a first-cut attempt at trying to model the process of government action. Whereas the previous model was a combination of equation, logical formulas, and statistical techniques, this policy model is an event-type simulation. It takes a list of projects to be initiated and goes through the whole development process of the project: the approval, if necessary, by the voters or government agencies; funding, staffing; organization, implementation; and the ultimate translation of these individual steps into community effects. Each of these logical stages is affected by the social and political variabilities. However, the policy implementation model is still very naive. A considerable amount of work has yet to be done in the area of simulating the implementation of government policies and programs.

These models, and all the computer programs, are tied together through an executive (See Figure 9) computer program, which controls the system and allows one to make changes in any of the submodels without major effects to the other sub-models. This "executive" divides the models into a number of sub-models, the small area sub-models, the government action model, and the input sub-systems. Each of these segments could be run either sequentially or in parallel, on a large machine.

Up until now, we have been talking about the structure of this city system model, in terms of its technical design. Let us look at the type of information which could be generated by this type of mechanism. Given the appropriate inputs, a print-out, as shown in Figure 10 (a), could be generated. The header (Figure 10 (a) indicates that this output is being run with the policy model being applied for a city named "Capsburg," which consists of seven neighborhoods or areas. A list of projects to be considered is also identified. This list of projects, in a specific mix, is targeted in a specific way. This print-out depicts the city of Capsburg at a certain time as a function of this particular set of programs. There are just a portion of the print-outs for one year. The time frame in this case is the year 1966. The system, however, could generate this kind of information for any year over which the models are run. Demographic and housing data is provided as well as a considerable amount of information on ethnic groups. For example, the people living in Capsburg are broken down into groups of white and non-white males and females by age groups.

Breakdowns are also provided on non-white groups by occupation. In this particular run, there were only two ethnic groups considered; but other ethnic groups could be added. There are only four occupation groupings in this particular run, but there could be ten or fifteen occupations. We also have a considerable amount of detail on education, such as the number of people who are 5 to 35 years of age in kindergarten, the number of people 5 to 35 years old in elementary school, and information on the people 25 years of age and older in school.

You might ask why we are using these particular breakdowns rather than others? In our survey of cities, we began to develop a pattern of the kind of data currently available. Our initial approach was to make use of the available data, recognizing that as the model was placed in use, there would be a greater need for dis-aggregation. In general, the data base was developed on the basis of data normally found or reasonably obtainable in most urban communities. The classification of data is enough to indicate that a fairly large amount of information is required to statistically describe a city system.

So far, we have been talking about the data needed to fully describe a city system. Let us get down to the more specific issue--the dynamic effects, in terms of this model structure, of decisions made in the city system. In studying the dynamically changing structure of the city system, we should recognize that people tend to reflect their own values and judgments as they evaluate data. They impute special significance to certain data and often draw results out of context. In order to avoid this type of bias, we attempted to develop a data base or framework for our analysis that was reasonable; that is, representative of the average city and yet not data drawn from a specific city. We took data from a group of cities, at random, and generated a realistic, but nevertheless hypothetical city named "Capsburg." (See Figure 11)

Capsburg has an elaborate data base to describe its seven neighborhoods. Just to give some idea of how one must get into the style and character of an area, we can take two neighborhoods, Area 3 and Area 7 in Capsburg. Let us contrast them. Both areas have the same population and roughly the same number of housing units, 1875 versus 1938. However, Area 7 is a more dense area, with 6,000 thousand square feet versus 31,500 thousand square feet. However, population density by itself provides no good measure of character. Spend a few days in selected areas of Manhattan and that will be obvious. Let us look a little bit further. In Area 3 the median family income is $7,500 versus $3,200 in Area 7. There are 21 per cent unemployed in Area 7 versus 2.9 per cent in Area 3.

With the type of data base available in a variety of different categories, it is possible to begin to form a qualitative description of each neighborhood. Our Area 3 is a typical, old, very high income professional community. Given enough different data, enough variations, and enough measures, it is possible to begin to develop a one-for-one comparison between the quantitative feeling of the style and character of the city system. For analysis purposes, we will use this hypothetical, but quite realistic, data base to discuss dynamic change.

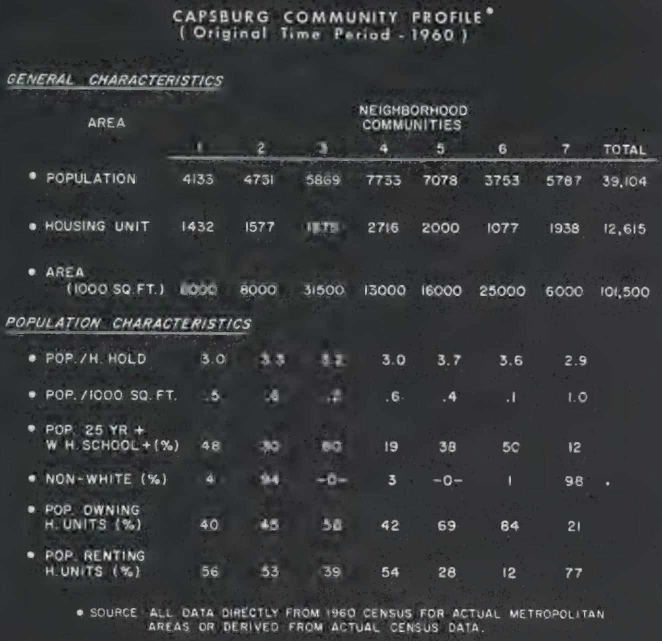
We have now defined our city system; but we have not yet explored the impact of the change on the system itself. To illustrate this type of change, let us take the results of the runs made on the model described above for the hypothetical city of Capsburg over the period 1966-1982. Starting with a data of 1960-61, we would like to explore the impact of a series of possible programs that could be implemented (Figure 13). In order to do this, we placed ourselves in the role of a planner for the city-system; and we then generated a series of seven projects, targeting them in various ways. We also set up various mixes of these projects and budgeted them in various ways. We wanted to determine for this purely illustrative mix of programs, which was the best mix, and which was the best budget level to achieve the greatest results in the city of Capsburg.

Although illustrative, these programs were primarily related to social change; and they could just as easily have involved urban renewal Projects. One of the results (See Figure 16) illustrates what happens in Area 7 (the slum) for non-white incomes of less than $3,000 over the period 1966-1982. This is assuming we are given 2 budget mixes; one at $775,000 per year, and the other at $380,000 per year as opposed to no program. When we first saw the results of this run, we felt that these projections could not be accurate. These sets of curves suggested that there was very little, if any, difference between the two mixes of funded programs as compared to no program whatsoever. We immediately started looking at the model structure for errors and we subsequently came to an interesting thesis, the Lake Mead analogy.

A man decides to fill Lake Mead, using a bucket. Relative to his own size, there is a lot of water in the bucket. He takes the bucket of water to Lake Mead and throws the water into the lake; the water level does not rise. He runs back, fills the bucket, brings it back to Lake Mead, and again throws the water into the lake. The water level still does not rise. The water he is throwing into the lake isn't going to fill the lake for a long time; the increase in the water level is going to stay much the same. As a matter of fact, we found that the amount of money we were targeting for improvement in the slum area was a just a drop in the bucket. It was very, very small relative to the size of the problem. Thus, the slight difference between the two budget mixes could be explained quantitatively.

Let us look at another factor in the city - education (See Figure 15). Whereas the income change for two programs as opposed to no program seemed to produce very little results in the area of education the results are quite dramatic. Initiation of an education program causes dramatic improvement as compared to no education program at all. However, there was little difference between the two funded programs. Look at the number of students who are in Area 7 and at the way the two mixes have been targeted. You will find little difference in the amount of money spent for education; one amount is roughly about $100 more per student per year then the other. Why does it take such a long period of time before the influence of a good program is felt in a slum area? Shouldn't we obtain beneficial results immediately?

First, it takes a considerable amount of time before a program can be fully implemented. In Capsburg, not enough teachers were available to initiate the programs. In the runs made, approximately two years were required to recruit and hire the people and to get the programs approved by the electorate. Measuring improvement in people with more than eight years of schooling, at least eight years also passed before the students got through the program. Our intuitive guess about the city suggested that initiating programs in education would result in dramatic improvements in the educational process. It didn't. In this example, it took a much longer time than we anticipated.



CAPSBURG COMMUNITY PROFILE*
(Original Time Period - 1960)

GENERAL CHARACTERISTICS

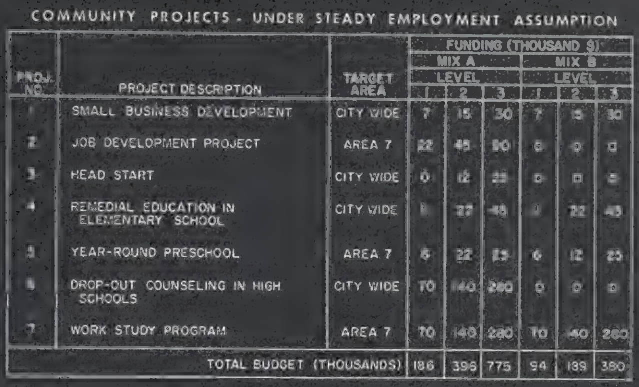
AREA	NEIGHBORHOOD COMMUNITIES 1	2	3	4	5	6	7	TOTAL
• POPULATION	4133	4751	5869	7733	7078	3753	5787	39,104
• HOUSING UNIT	1432	1577	1875	2716	2000	1077	1938	12,615
• AREA (1000 SQ. FT.)	[illegible]	8000	31500	13000	16000	25000	6000	101,500

POPULATION CHARACTERISTICS

	1	2	3	4	5	6	7
• POP. / H. HOLD	3.0	3.3	3.2	3.0	3.7	3.6	2.9
• POP. / 1000 SQ. FT.	.5	.6	.2	.6	.4	.1	1.0
• POP. 25 YR + W H. SCHOOL + (%)	48	30	80	19	38	50	12
• NON-WHITE (%)	4	94	-0-	3	-0-	1	98
• POP. OWNING H. UNITS (%)	40	45	58	42	69	84	21
• POP. RENTING H. UNITS (%)	56	53	39	54	28	12	77

* SOURCE: ALL DATA DIRECTLY FROM 1960 CENSUS FOR ACTUAL METROPOLITAN AREAS OR DERIVED FROM ACTUAL CENSUS DATA.

Figure 12



COMMUNITY PROJECTS - UNDER STEADY EMPLOYMENT ASSUMPTION

PROJ. NO.	PROJECT DESCRIPTION	TARGET AREA	FUNDING (THOUSAND $) MIX A LEVEL 1	2	3	MIX B LEVEL 1	2	3
1	SMALL BUSINESS DEVELOPMENT	CITY WIDE	7	15	30	7	15	30
2	JOB DEVELOPMENT PROJECT	AREA 7	22	45	90	0	0	0
3	HEAD START	CITY WIDE	0	12	25	0	0	0
4	REMEDIAL EDUCATION IN ELEMENTARY SCHOOL	CITY WIDE	11	22	45	11	22	45
5	YEAR-ROUND PRESCHOOL	AREA 7	6	22	25	6	12	25
6	DROP-OUT COUNSELING IN HIGH SCHOOLS	CITY WIDE	70	140	280	0	0	0
7	WORK STUDY PROGRAM	AREA 7	70	140	280	70	140	280
		TOTAL BUDGET (THOUSANDS)	186	396	775	94	139	380

Figure 13

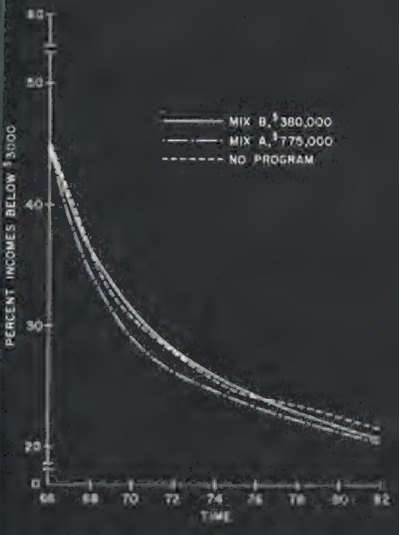


Figure 14

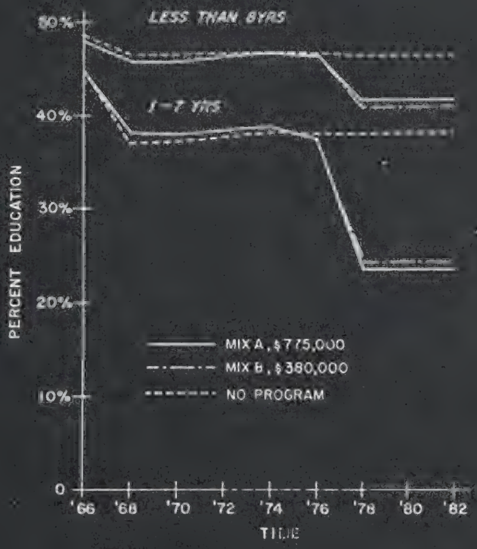


Figure 15

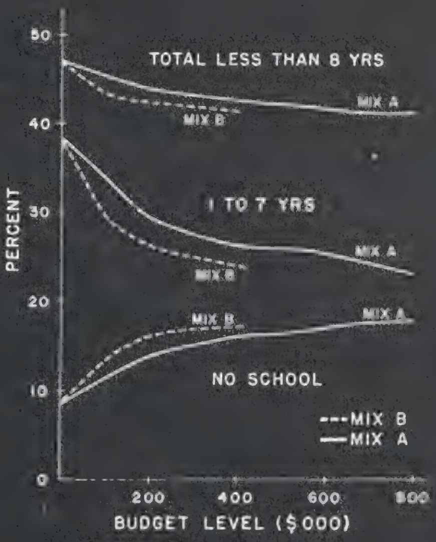


Figure 16

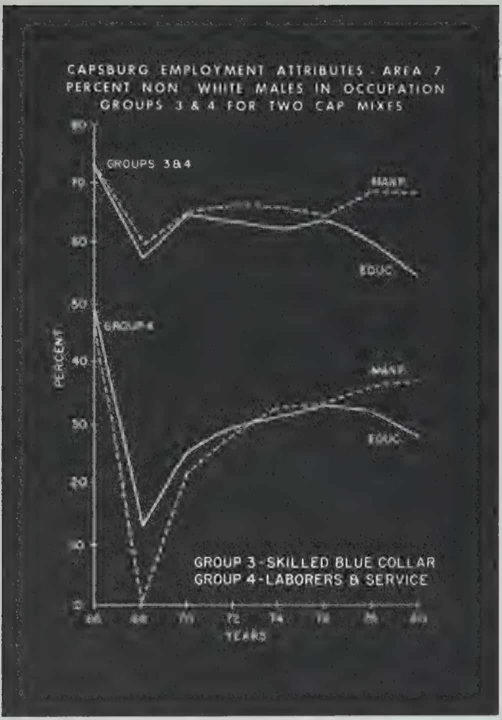
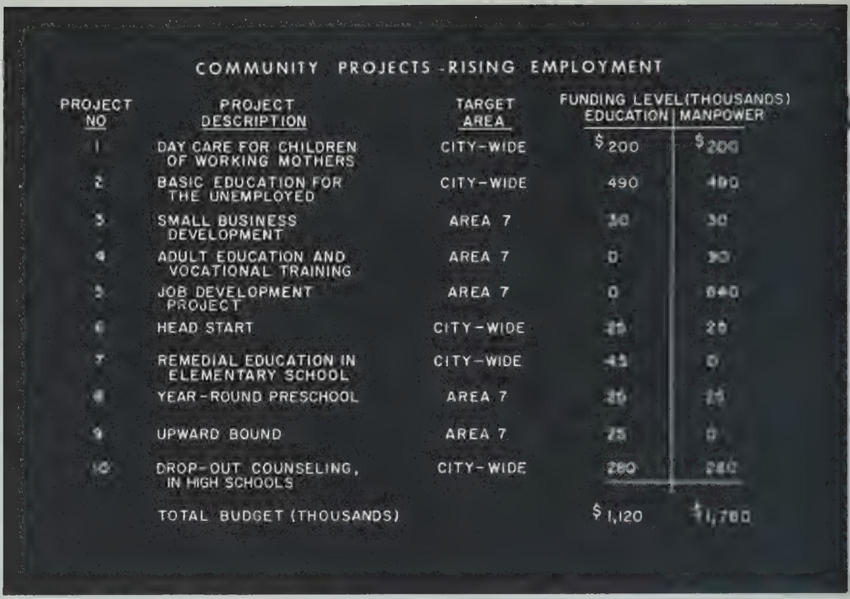


Figure 17



COMMUNITY PROJECTS - RISING EMPLOYMENT

PROJECT NO	PROJECT DESCRIPTION	TARGET AREA	FUNDING LEVEL (THOUSANDS) EDUCATION	MANPOWER
1	DAY CARE FOR CHILDREN OF WORKING MOTHERS	CITY-WIDE	$200	$200
2	BASIC EDUCATION FOR THE UNEMPLOYED	CITY-WIDE	490	400
3	SMALL BUSINESS DEVELOPMENT	AREA 7	30	30
4	ADULT EDUCATION AND VOCATIONAL TRAINING	AREA 7	0	30
5	JOB DEVELOPMENT PROJECT	AREA 7	0	840
6	HEAD START	CITY-WIDE	25	20
7	REMEDIAL EDUCATION IN ELEMENTARY SCHOOL	CITY-WIDE	45	0
8	YEAR-ROUND PRESCHOOL	AREA 7	20	25
9	UPWARD BOUND	AREA 7	25	0
10	DROP-OUT COUNSELING, IN HIGH SCHOOLS	CITY-WIDE	280	280
	TOTAL BUDGET (THOUSANDS)		$1,120	$1,700

Figure 18

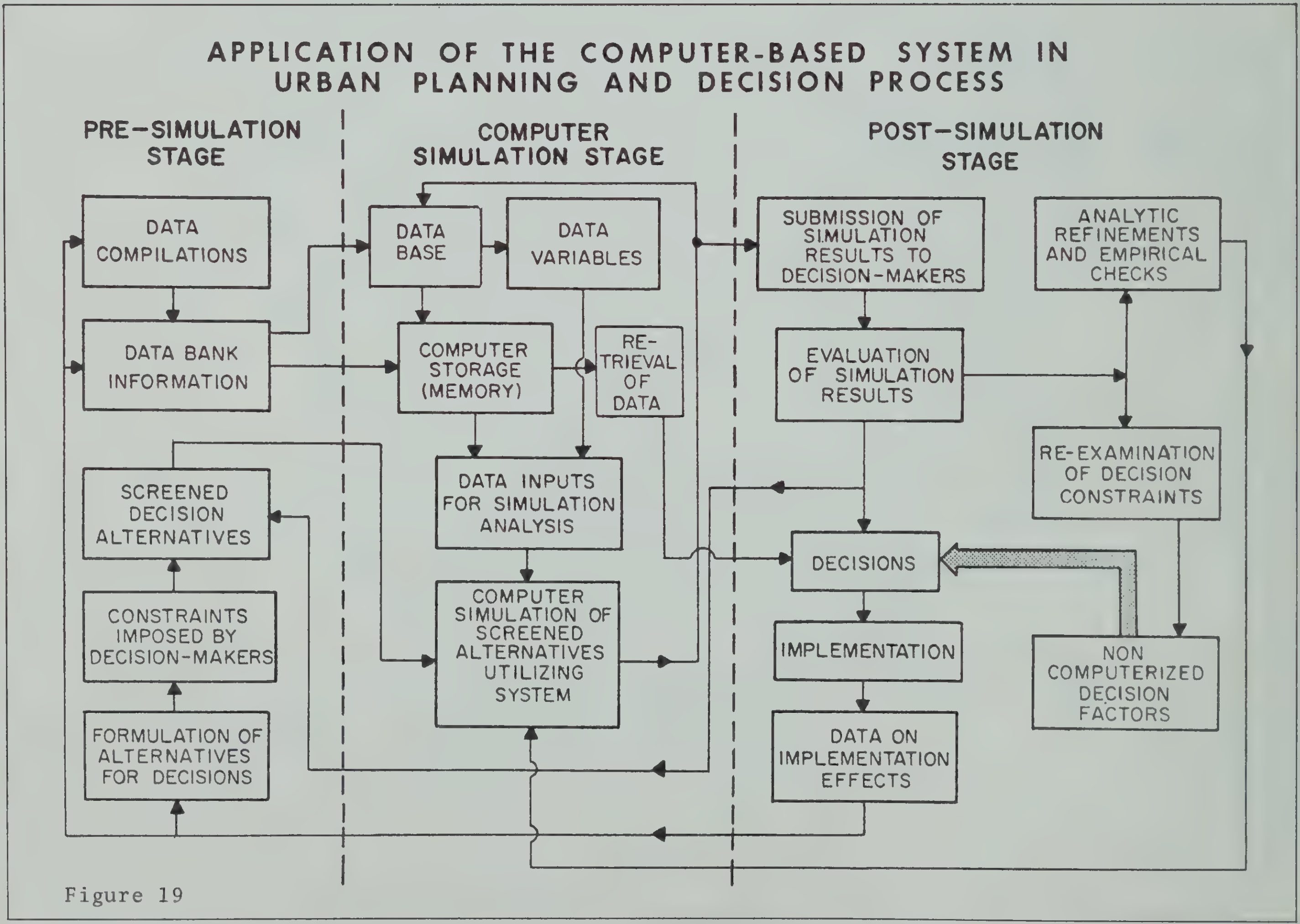

APPLICATION OF THE COMPUTER-BASED SYSTEM IN URBAN PLANNING AND DECISION PROCESS
PRE-SIMULATION STAGE
COMPUTER SIMULATION STAGE
POST-SIMULATION STAGE
DATA COMPILATIONS
DATA BANK INFORMATION
SCREENED DECISION ALTERNATIVES
CONSTRAINTS IMPOSED BY DECISION-MAKERS
FORMULATION OF ALTERNATIVES FOR DECISIONS
DATA BASE
DATA VARIABLES
COMPUTER STORAGE (MEMORY)
RE-TRIEVAL OF DATA
DATA INPUTS FOR SIMULATION ANALYSIS
COMPUTER SIMULATION OF SCREENED ALTERNATIVES UTILIZING SYSTEM
SUBMISSION OF SIMULATION RESULTS TO DECISION-MAKERS
EVALUATION OF SIMULATION RESULTS
DECISIONS
IMPLEMENTATION
DATA ON IMPLEMENTATION EFFECTS
ANALYTIC REFINEMENTS AND EMPIRICAL CHECKS
RE-EXAMINATION OF DECISION CONSTRAINTS
NON COMPUTERIZED DECISION FACTORS

Figure 19

The many types of measures we have been discussing are almost infinite. There is no particular reason why we have selected these two programs. However, an examination of the two measures raises an important question, "Is it better to take action with respect to immediate outcome, or with respect to relative educational improvement?" Because of the dynamic inter-action of the city-system, the question of real values becomes extremely important. This question can be answered by a cost-benefit analysis; that is by taking a set of program mixes and by varying the budget levels, at a given period of time, to determine the effect of marginally increasing or decreasing the budget levels relative to particular objectives or values. An example is the case depicted, showing the percentages of people with less than eight years in school (See Figure 16)* This analysis suggests that increase above $400,000 level provides little increase in performance. This budget level must be significantly greater before any significant effects are produced.

After going through this analysis, we began to realize that a logical and comprehensive analysis of the city system could give us much more information than our own individual and intuitional views of the city as a series of sub-systems. We then started to develop a concept to pool projects and program mixes in order to develop a strategy for program formulation in the city system. We set about developing different mixes of projects (See Figure 17) with long-term results for either improving the educational or income levels through manpower development and utilization. Then, we ran these programs in the city-system model. One area of interest was the percentage of people in two key employment groups: Group 3, the skilled blue-collar workers; and Group 4, the laborers. The outcome of the programs for these two groups suggests there is a difference in man power orientation versus educational programs.

We noticed that because of the particular way in which the programs were targeted, it seemed to suggest that in Area 7 in 1968, it would be nearly impossible to get a shoeshine, for example. There would be no laborers and service workers available.

However, by 1972, the situation would have appeared to return to normal. In order to explain this apparently unrealistic situation, we examined the model structures, the targeting, and the budgeting involved; and we found that the programs were generating more jobs in Area 7 for Group 1, 2, and 3 occupation levels than there were people available. In effect, then, the shoeshine boy could get a job as a skilled blue-collar worker even though he was not qualified. Although shoeshine jobs were available, the manpower to shine the shoes was not available. If such were the case, and if an improvement were made in the area, why did the situation return to its normal state?

The model structure took into account the mobility of the population. The skilled blue-collar worker in Area 7 was able to work at the next higher occupational level now; and his income was increased. The increased income then enabled him to "escape" the slum, by moving out. The shoeshine boy also had more money and could now afford a slightly higher standard of living. Who, then, occupied the vacant housing left by the blue-collar worker? The model suggests that a new individual from outside the core community, an individual at a lower poverty level than the man previously living there, moved in. For this particular example, what has been done is to bring into the slums people whose income levels, health, and education levels are worse than the people there before. By trying to improve social and economic conditions through targeting programs in the slum area, we have simply "moved people around."

As new people move into Area 7 there are people available to shine shoes; and the situation returns to normal. We assumed, as do many planners, that if the neighborhood were improved it would be better off. We neglected to assume that in the dynamic city system, people move about and have the ability to migrate from one place to another. Through this particular set of programs, we could improve the lot of the people in the area; but there would still remain other unimproved areas. In general, the population in Area 7 remained constant over time; but the non-white populations in Area 3 and in Area 6 grew dramatically.

The examples discussed are only illustrations of a hypothetical community, but they demonstrate the value of looking at the whole system in planning for change. City system models, such as the one described here, can be extremely useful in planning for urban and social change. An overview of the application of such a simulation model is shown in Figure 19.

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* As in all other examples, this data was developed, using the model structure and the Capsburg data base.

One of the extremely important consequences of this approach is that it allows one to obtain data on implementation effects and to begin to compare this data with the actual occurrences at a future time. In most cities today there is little opportunity to compare the assumptions, which initiated the planning and decision process for social change, with the final results.

The city system model also provides the guidelines for further research. It acts as a vehicle for further analytical refinements, checks, and re-examination of the decision and restraints. This type of model technique is now being applied in a few limited cases. It is still a long way from practical use, but it represents an approach to viewing the city as a system. There are a number of problems with this type of technique. First of all, the logic of the model has not yet been fully tested over time. Further detailing is required, particularly in the areas of education, health, and welfare. In addition, there is a need for the creation of a regional or rural sub-system to adequately consider migration from the core city. At present, we can only view this city as an isolated system; and we can't consider the impact of the city on the surrounding area. For this reason, one needs to build an area model. As for the policy or government action model, it will require extensive analysis and definition before it will become a useful tool. Lastly, a technique is required to generate exogenous parameters. These are the specific descriptions which identify the differences in an urban area, characterizing it quantitatively. By this we mean those differences which separate one city from another, versus those which characterize all cities, in general.

There are a considerable number of advantages to the model city system. First of all, this approach focuses on the total structure of the city and considers its dynamic interaction. Secondly, it provides a mechanism for considering alternative plans and priorities. Many approaches to city planning consider only one plan, or a few variations on a single plan, ignoring alternative ways of achieving the same goals. Thirdly, it forces a quantitative consideration of both the short and long-run effects. In many cases, the emphasis is on the short-range ignoring the long-range; or on the long-range ignoring the short-range. The city-system model forces one to consider both time frames at the same level of detail. This approach tends to reduce areas of potential conflict due to intuition; and it allows more emphasis to be placed on the basic objectives and values. The city-system model also provides a basis for organizing data and for utilizing the decisions to be made. It acts as a model structure and mechanism for deciding how aggregate or disaggregate a data structure needs to be.

In summary, we have described an approach, a first attempt to quantitatively structure the city as a dynamic system, using the computer and operations research techniques. The methodology allows us to begin the exceedingly difficult task of predicting community characteristics over time; exploring the types of government action; and examining the future impact of individual projects, alternative project mixes, and budget levels. It provides us with a beginning to examining alternate organizations and types of communities.

As an approach, it is only in the early stages of development. However, new techniques, such as these, are now becoming available and will in time provide the basis for operating the city as a system.

Thank you very much. (Applause)

At this point, participants break up into smaller workshop sessions to discuss the following questions:

1. What is the basic objective of the city? For what purposes does it exist? Does it exist because people live in one place in a group, or does it have its own goal? Who does the city serve, and who should be served? (There is a difference)

2. With nearly two-thirds of the United States' population living in cities and in urban suburbs, how can we determine where the "core" city, the city itself, ends and where the urban area as a whole begins?

3. What are the best mechanisms and tools for planning in a city? Are they the more sophisticated techniques, described previously; standard techniques; or other means? Role playing has been suggested as an example of an "other" means. A definition of role playing: a situation in which a group of people are brought together to consider by game playing what the alternatives should be. If there are such tools, who should be exercising them? Should this planning be done on a centralized or decentralized basis? Is planning more effective when done by one central planning authority or by each of thirteen classes of planner groups?

4. We have indicated that objectives and values are extremely important when one is considering government action. Who should establish the objectives and values in a city? Should objectives and values be established by the open market, by the electorate, by government agencies, by planning authorities, or by others?

5. What are the technological innovations which will affect the city of the future? We have already identified one planning innovation. Certainly the elevator was a technological innovation which affected the city system. The concept of pre-stressed concrete also had an effect. There are certainly other technological innovations on the horizon. How will they make the city system of the future more complex?

PLENARY SESSION BEGINS.

MR. BLUMBERG: Gentlemen, can we be seated? I think we are ready to get started. Are all the groups back? Are there any other working groups? The purpose I understand of this last half hour or three-quarters of an hour is to allow me to field the questions that you have or to raise questions that were raised in the discussion groups.

MR. CASS: My reaction was that our group got into some very, very general discussions and comments which led to really no conclusions whatsoever. I am not sure we could agree on basic definitions, let alone answers to questions. I really think that is a valid summary, and I would welcome any disagreement.

MR. BLUMBERG: Well, that is an interesting start right there, because you are suggesting that your discussion group consisted of a number of different types of people looking at urban areas. Each member of the group has his own jargon and focus. Did everybody else come to the same conclusion? There apparently was a basic problem in attempting to answer the first question. As I remember, when we stopped in on one of the groups, they were hammering at the question, "What was the objective of the city?" It seemingly was difficult to define basic terms. Did everybody find the same problem? Was it difficult to establish the objective of the city system?

MR. MOLONEY: I thought that in our little group we reached the conclusion that the cities arise out of a need to exchange goods, services, and ideas. The cities serve as a focal point for educational institutions, engineers, and people walking around looking for shoes. This was the historical origin of cities, and it apparently remains valid in new and varied forms today. People need cities as places in which to exchange goods, services, and ideas; that was one agreement I thought we reached.

MR. BLUMBERG: That is interesting. I would like to pose a question. Is Route 128 a city? By your definition, it is, since it is an area in which there is a tremendous amount of exchange going on.

MR. MOLONEY: It is both a city and a part of a city.

MR. BLUMBERG: Is it a strip city? I would be interested in your general reactions to whether or not Route 128 is a strip city.

FROM THE FLOOR: Isn't it only a part of the metropolitan city? Its role is certainly a valid part of the industrial part of the city of Boston.

MR. BLUMBERG: Is Boston the center of the metropolitan city system in your opinion?

FROM THE FLOOR: No, it is a section of the metropolitan city.

MR. CASS: It exists because of the educational institutions farther down.

FROM THE FLOOR: Research of Harvard and M.I.T. is implemented on Route 128. That is a valid point.

MR. BLUMBERG: Let me take another situation which is similar to Route 128. Take a look at the San José strip, which runs, I believe, from San Francisco down through San José. There is a strip very similar to Route 128. Would you call that complex a city? It certainly is separated from the city of San Francisco.

MR. CASS: What is your definition of a city?

MR. BLUMBERG: You identified the primary function or objective of the city as a means for communication and interchange of goods, ideas, and services. Using this definition, we can talk about a new, emerging type of a city that looks like a strip.

FROM THE FLOOR: I don't think you can call it a city, but it is an extension of the city.

FROM THE FLOOR: In my opinion the city is a place in which there are buildings, people rendering services, and people ordering services. Here I don't think we are filling the bill.

MR. BLUMBERG: May I react to that? I don't know how many places you have been in the Army, but there is a city in Arizona called Sierra Vista near Fort Huachuca. Sierra Vista sits in the desert approximately sixty-five miles from Tuscan and sixty-five miles from Nogales, Mexico. It is as isolated as it can be. The air is as clean as you can possibly imagine. There is little or no juvenile delinquency; the birth rate is high; the death rate is low. The city is completely isolated, and yet it is a city by your definition. The problem, as we move to city systems such as Philadelphia and Boston, is that the structure has changed. We have lost that nice element of isolation which Sierra Vista has.

FROM THE FLOOR: Your explanation is too sterile. We have never been that sterile. I am not talking about a completely ideal, germ-free area. We are not supposed to smoke, but we smoke, etc. Nevertheless, the environment that people live in every day should be of some concern, not only to themselves but to others, the leaders. It is my opinion that we have not concerned ourselves enough with the cleanliness of the city.

MR. BLUMBERG: On that I agree

CDR. BURCH: In addition to the things that have been brought up before, the city also provides services that individuals cannot afford to provide for themselves. In general, the same can be said for any government. The services provided are: fire and police protection, sanitation, trash collection, water, etc. In addition to providing a place in which people can live and work, the city system is an organism that provides important services.

MR. BLUMBERG: I agree.

MR. DILLON: Let us return to the question on Route 128 versus your little community out in Arizona. I would be inclined to think Sierra Vista is a city; it has an artificial existence as a military base, a legitimate base. Route 128 is just a segment of the organism, as the Commander described; and I think the city has to have the elements of an organism as a city. I would consider electronic row comparable to the insurance district, the financial district, the leather district, the wool district, or the shipping district.

MR. BLUMBERG: What, if within the next year, we could reconstruct the boundaries and draw the governmental boundaries along the lines of Route 128? If I define my boundaries in a governmental sense with enough of the population, I can establish necessary grounds to move to a Class 1 or Class 2 city. At that point, I could establish all the necessary mechanisms to define the city. However, it seems to me that with either position you take, you must ultimately come to grips with an issue that has not been discussed as yet - government political boundaries. They are just as important in defining the city space as any other single element I know. Yet, there seems to be a lack of discussion of it so far. We have talked about transportation and improvements in the well-being of the city population. Why haven't we talked about the political structure?

FROM THE FLOOR: If you were a planner with the opportunity to plan a new area and call it a state, would you be in favor of county government?

MR. BLUMBERG: Perhaps political boundaries are the very problem we are up against. Let us take the Philadelphia area. To effectively plan for the problems that face the city of Philadelphia, with which I happen to be more familiar, you must include the city of Camden and the outlying suburbs on both sides of the Delaware River.

You can't consider the city of Denver as separate from Boulder and Colorado Springs. However, we don't have anything in our standard framework of local government that we can call a metropolitan area. In the metropolitan area, there are no provisions for a police department, educational department, or transportation department. If we get down to the definition of the city, it seems to me that in our present framework, we will have to frame it in terms of a political designation.

FROM THE FLOOR: Isn't it possible that your original approach to defining a city is wrong? In the past there were walled cities in Europe and Asia. Their only purpose was to protect the people by providing a common defense against marauding forces in the area. The people had to have a common means of protection; the city provided it. If you look at it in that manner, you might see that our cities of today are all very similar in structure. Man gathers into groups in a common area not only because he is a gregarious animal, but because he needs protection. As the population grew, these cities started to go beyond their boundaries and overlap.

MR. BLUMBERG: I would like to suggest that the city does more than just provide a common defense. For instance, the division of labor principle existed in ancient Rome. There were money lenders, who provided a service, but who had to live near other services (food, etc.) to survive. The reason for the emergence of the city in the beginning may have been its function as a means of defense, but ultimately, that function disappeared. However, our legal mechanisms today are still geared to the functions of the past.

MR. GREENFIELD: It seems a shame to cut off the discussion. I know everyone is interested in maintaining it. All I can say is at our next session we will have an opportunity to continue in the same vein.

I would like to thank Mr. Blumberg for what I consider an overwhelming presentation and for conducting this discussion. (Applause.)

(Whereupon, at 5:10 p.m., the workshop adjourned.)

URBAN PHYSICAL STRUCTURE AND SYMBOLIC FORM

The second workshop in the series on "Environmental Design for Decision-Makers in Government" convened in the Boston Architectural Center at 2:15 p.m., December 5, 1967. The subject, "Interaction Between Urban Physical Structures and Symbolic Form". The speaker, Herbert L. Bogen. Mr. Glassman, Chairman, presiding.

CHAIRMAN GLASSMAN: I want to welcome you all again to the Boston Architectural Center. This is our second workshop on "Environmental Design for Decision-Makers".

I know we in the committee are greatly encouraged by the degree of participation in these programs as was evidenced last time and we have taken advantage of the suggestions that were made. You have all received a mailing and you can see how we have slightly changed the program and the format in conformity with the suggestions that were made.

Our speaker today is somebody who I know very well because I have worked with him this past year. He is a member of my committee setting up these programs. His experience, his knowledge and his enthusiasm were very effective on our committee in setting up these programs, and I know it will be communicated to you today through his remarks.

Herbert L. Bogen is a planning consultant and an architect. He is a principal in the firm of Herbert L. Bogen and Associates in Cambridge, Massachusetts, and they are engaged primarily in urban design and research.

He is a graduate of Yale University with a Bachelor of Architecture and a Doctoral candidate in city and regional planning at Harvard. He is the chairman of the Joint Council on Environmental Design, a task force of the Boston Society of Architects, and a member of the Boston chapter of the American Institute of Planners and the Boston Society of Landscape Architects. He has acted as a consultant to many cities in the Commonwealth of Massachusetts, including Boston, Brookline, Fitchburg, Framingham, Haverhill, Peabody, and others. He is particularly interested in the ways in which applied urban research may facilitate policy-making and decision-making in government.

Mr. Herbert Bogen.

MR. BOGEN: Thank you. The title of the workshop today is "Interaction of Urban Physical Structure and Symbolic Form".

Man and his environment are bound together in a tight web of delicate relationships upon which depend life and death, success and failure, hope and despair. All systems analysis begins here at the very basis of our existence. From the simple act of breathing to the configuration of the earth, the release of energy, and the changes in the chemical content, the radiation level and the temperature of our atmosphere, a continuing transaction goes on between man and the environment.

We alter the environment and it in turn alters us. Each of these exchanges has some meaning or significance in relation to human purposes, desires, motives and goals. We see certain natural processes as threats, others as promises; some may be mysterious and inscrutable or we may find some of them revealing stores of knowledge about ourselves and the world around us. We are constantly making judgements about the world, not only the natural environment, but also the man-made environment which is an extension of ours and is, therefore, charged with more human content.

In order to understand and deal with any environment, we must first perceive it. Perception involves more than the eye and the other sense organs. The whole person is involved in perception; his senses, his mind, his nervous system, and his kinesthetic muscular sensations. Perception is active, not passive. It is a selective and organized activity. We respond not only to what we see, to forms, color, movement of objects in the environment, but to the meaning or significance which they convey to us. Such significance may exist at various levels. Much of it exists in the form of information which provides cues as to how we should react appropriately to the particular objects and situations we encounter. We are not even aware of much of the perception which goes on, since only part of it is at the conscious level of the mind.

But there is another kind of meaning, distinct from information, which I refer to in this talk as symbolic. There are visual forms which may suggest or express such characteristics as wealth, power, sacredness or vulgarity, order or disorder. This kind of symbolic meaning which we may find conveyed to us by the form, color, movement, light, sound, and so forth of the civic center and amusement district, a large government complex tells us something about the nature of the activity or the nature of the structure which may affect the way in which we relate ourselves to it as human beings.

These are things which may be important to us because of what we believe in relation to our sense of values about the world. It touches upon what we think is important or unimportant and reflects upon our own inner nature as persons. Such symbolic meaning may be correctly matched with the true inner nature of the area of the city or of a particular structure or, as is the case too frequently, it may be inappropriate. Further, certain combinations of form, color, light, sound, and movement are fundamentally appropriate for certain symbolic meanings and tend to indicate such meanings whether they are intended to or not, and I shall go into the various theories which have been advanced to explain why this is so.

I think that it is clear by now that we are really talking about a form of communication, but not communication as we normally think of it, using words or mathematical equations. Communication involving space, form, shape, color, light, movement and sound, which depends upon the direct perception of meanings which are given by various combinations of these elements, is non-verbal communication. As an example, let us take the element of light. Light has many utilitarian functions; it provides illumination for human activities in buildings and on streets; it is used for signals and for attracting attention to commercial wares. But light as a symbol is associated with the human mind, with the life spirit, usually in the form of the light of the flame of a candle. It can symbolize the fragility and the evanescence of life; its flickering movements suggest change, effort and vitality. And, as we know, light may be snuffed by a gust of air or a candle may be consumed, so that the mortality of all life is expressed in this symbol. In symbolic terms, light also implies understanding, since it enables us to see and to know. We speak of the lamp of knowledge and we have such college mottoes as "Light and Truth".

Light also implies security and safety, in contrast to the meaning of dark, shadowy forms and areas. For this reason, it also suggests freedom of movement.

The quality of light may be used to suggest gaiety and celebration or solemnity or mundane, everyday activities. Light is also used to single out other significant visual forms.

Lighting a building, for example, can combine two strong symbolic references in the form of the structures and in the symbolic meaning of the light itself.

In discussing the symbol of light, it should be noted that one part of the symbolism sometimes involves a process. There are many symbolic meanings which may be attached to a process over time, rather than to a single configuration or structure or object which may be seen singly at one instant.

Such things as decay and renewal, novelty and absolescence are things which must be viewed over time. So that it is not only the completed object or the structure of the city seen in one day or in one month or one year, but it is the experience of perceiving the city and its various districts and component parts over a long period of time, over many years, which enables us to grasp the meaning of the process of change which we observe. Both our own memories and the recorded memories of other people made available to us in the spoken and written history of a place, determine our understanding of what we see and experience.

In viewing demolition or highway construction in Boston, for example, we see at various times the process of transformation which goes on continually in cities. When the old and familiar is torn down for the new and unfamiliar, it is easy to understand why people often have strong emotions concerning such physical changes, even though they do not have a direct concern in it themselves. Any action involving striking, breaking, or even tearing in the slightest degree symbolizes to some extent death and destruction. At the same time an introduction of a new physical element is sometimes seen in terms of an alien intruder or as a new trend, depending on how effective the new adjustments and relationships are made between the new and the old.

I have often been impressed at hearings and discussions concerning the locations of new highways or in the confrontation between the exponents of rapid transit and of highway construction of how quickly these discussions can move from technical considerations to words charged with emotional and moral feelings which are imputed to one form of transportation or another.

In order to understand the various kinds of behavior which I have described, I would like to present the following scheme which is based upon the writings of Rudolf Arnheim, a psychologist who has written on visual perception and the psychology of art. Arnheim states that all psychological processes must be described by three fundamental aspects. These are, first, the cognitive, which is concerned with knowing and understanding the objects and actions which are observed. Second, motivational processes which have to do with what strivings take place in relation to these objects or actions. And third, the emotional processes which indicate how strong are the tensions produced by such strivings.

All mental events are perceived consciously or unconsciously, and these may be divided into two types. The first of these are those which are extracerebral, which are stimulated by events outside the brain, but which may be either inside or outside the body. For example, if you see some food, that is something outside the body. If you feel hungry, that is something you feel inside your body.

Second are those events which are events which are determined intra-cerebrally, which are stimulated by events inside the brain, such as thoughts, desires, and images. All of these processes are those which I previously have termed cognitive.

I have mentioned the motivational processes which involve striving toward a definite goal or objective. Perception itself is purposeful and goal-directed. There are intracerebral recognitions of expressiveness of motivation or purpose. For example, perception of the intent control of the body of a cat springing at a mouse or of a soaring tree or a Gothic arch, may be matched by intra-cerebral thought contents which compare or relate expressive qualities with concepts such as power with strength, peace with quiet, freedom with wide, expansive space.

The third aspect, emotion, is the tension or excitement level produced by interaction of mental forces. Arnheim states, "In the mechanics of the mind emotion is the stress caused by the traction and pressures that constitute mental activity, this emotion does not contribute impulses of its own, it is merely the effect of the play of forces taking place with the mind."

Using this outline, what may we say are the specific needs which are filled by symbolic forms? Persons are constantly scanning the environment as they go about their various activities. Most human behavior is purposeful and involves goal seeking, but there is a considerable range between attitudes and motives of, let us say, a tourist in a sight-seeing bus, a person walking to his place of work, or a motorist looking for a parking place in a city. Each perceiver is looking for clues in the environment which will provide meaning, which will help him serve certain needs which he has.

In our example, the tourist may be trying to identify and learn about an important building or an historical site as Trinity Church in Copley Square. A person on his way to work, however, glances at passers-by, changes in store window displays, traffic, and the familiar buildings and streets. He has a different attitude. He may be in a fairly relaxed mood looking for things which would provide some interest to him on his journey to work and which would make it more pleasant.

The motorist is hunting frantically for a parking space and searching the line of cars and street signs and is trying to keep out of the way of the motorists and other cars and the honking of the horns. He is strongly motivated with a rather narrow interest in the environment at the moment.

If each of these three individuals is able to perceive easily and readily visual forms and signs which allow him to see, understand, and move about and satisfy his goal, he will have a sense of well-being. He will be relaxed, coordinated and have a sense of control over himself, and a feeling of rapport with his environment.

On the other hand, if he is confused by a disordered jumble of buildings, signs, vehicles, noise and fumes, he will have a sense of irritation and annoyance and a lack of relationship to the environment, with a corresponding feeling of a loss of control or any means of dealing with such an environment.

There must be a linking of the patterns that we perceive in the environment and correspondences which they have with patterns or forces in the human mind which are related to purposeful striving of various kinds.

The task of those who build and design cities is how to make the underlying structure and meaning of the city visible and understandable. In the examples which have been enumerated, the perception described is at the information processing level. This is most important in order to carry out all the activities upon which our existence depends.

However, as I have said, the visual forms we see convey more than information; they convey expressive values which have human significance.

For example, the meaning of Trinity Church as given by its visual form is of rugged power in its massiveness, darkness and in the harmony and unity of its forms. In the use of a Romanesque vocabulary Richardson evoked as much of the characteristics of 19th-century America and its dominant religion as he did of the stalwart Normans of the 10th and 11th centuries.

On the other side of Copley Square, as we know, the Boston Public Library and its Florentine garb is cultured, formal, learned in its allusions to the past, recognizable for what it is.

And similarly, the Sheraton Plaza Hotel reflects a quiet elegance as expressed in another, later, style of architecture. Standing in Copley Square one may sense the striving of a society seeking cultural status and borrowing freely from past architectural styles of the Old World in erecting its new monuments. And in noting the form of the buildings themselves, it is strange how they seem to match certain characteristics of American society of the period. Also, having them grouped together all in one place suggests the fragmentation, the abruptness and discontinuities of much of American life both in the past and in the present.

By way of contrast, our new Government Center in Boston speaks in today's architectural vocabulary. The new City Hall has a Richardsonian robustness befitting the vitality of politics in Boston. It clearly indicates that this is a place set apart from the goings on of the market place. It is forcefully monumental. It will not be ignored.

The Federal Building and the state office buildings clearly indicate their function, which is the day-to-day work of a vast complex of agencies and bureaus. They do not have the ceremonial and symbolic functions of the City Hall.

The commercial office buildings are rightfully subordinated, and the graceful curves relating to the street pattern and the old Sears Crescent clarify the movement and the pattern of traffic and lend vitality to the overall design. Linkages and views to Dock Square, Fanueil Hall, and Quincy Market are sensitively handled in accordance with the basic plan.

Although the Government Center does not seem to have attained the unity and coherence of many of the great spaces of the European cities, the symbolic aspects of the forms of the buildings, streets, pedestrian ways and spaces are easily grasped and reasonably well related. People working and visiting the Government Center will have a sense of how this part of the city functions, the needs it serves and its relationship to other districts of the city.

This is accomplishing a great deal. Whether or not it is finally accepted and admired and cherished by Bostonians will depend upon how well it actually fulfills what it promises and also on the patina of history and memories which are an important component of all significant urban environments.

I have referred to expressive form and symbolic form as embodied in monumental buildings and important centers and squares, but it is not restricted to these. All forms and spatial relationships have symbolic component.

Our recognition of such a symbolic component is partly biological inheritance, partly developed by cultural influences. All expression is related to an inherent recognition of a configuration of forces, however and whenever they appear. These, in a sense, are similar to the kinds of configurations of interrelationships which we have been referring to and will continue to be referring to when we speak of systems and system analysis.

Here, however, we are referring to visible things which seem to exhibit such characteristics. These are relevant to us because we ourselves are such a configuration of forces and we experience and observe similar tendencies in the physical and mental world in general.

For example, rising movement is linked with experiences and concepts of aspiration, achievement, effort and power; and descending movement may have different connotations; falling certainly is a symbol of misfortune, failure and disgrace.

Depending upon the direction and rate of movement, a whole range of shades of meaning may be made out of this single kind of relationship. This particular meaning arises out of a configuration of forces we are all familiar with. It relates to the pitting of our physical energy against the force of gravity. By relating this kind of experience to other experiences we are using metaphors. We are bringing together things which have structural similarities.

Our understanding of what forms mean is built of such recurring experiences and also of cultural influences, such as the store of images and ideas which we have in our minds. Our ideas of balance come about because of our vertical posture and knowledge of the effort to achieve and maintain verticality.

Vertical forces which are tipped slightly are disquieting and cause feelings of uneasiness and anxiety, as in the Leaning Tower of Pisa. Some people get a similar impression when they are close to a skyscraper; they sometimes have the illusion that it is tipping forward.

On the other hand, horizontal forms suggest rest and security. We lie down to sleep. Our efforts to maintain the vertical posture are given up, and we are supported in a horizontal plane.

The clustering of large, massive vertical forms can express competitive effort for space and status, as in the unplanned coincidence of forms in the downtown Manhattan skyline. Contrast this with the skyline suggested in this waterfront project proposal for Boston.

Pyramidal forms have been used for monumental ceremonial purposes by many ancient civilizations.

The Mayan pyramids, for example, is a stable, static form converging at an equal rate to a well-defined limit at the top.

The inverted pyramid as used in the Katamavik at Expo 67, is stable, but in a kind of dynamic equilibrium. It suggests that it must be perfectly balanced. One feels that too much wind load on one side or too many people on one side of the platform will upset the delicate equilibrium. It is like a ballet dancer twirling on one toe or like a funnel converging on the base extending infinitely outward at the top. It is startling, puzzling, expansive form.

Visual forms which try to suggest one concrete form with another which has no relevant connection or functional relationship are always unsatisfactory. The opera house in Sydney, Australia, for example, in which the concrete shell arches are made to resemble the sails of ships in the harbor is an example of this, as are churches shaped like fish, or airport terminals with winglike forms.

Groups of buildings may suggest different levels of control or lack of control and varying degrees of concern for the individual. A rigidly regimented order, such as may be seen in New York City slums or any large public housing project, is felt as stifling and as controlled by inhuman outside forces, and too little order results in a bewildering chaos, of no control at all. Both of these have been found to be equally inadequate environments for low-income families. Sometimes it is partly due to the internal designs as well as to some of the external features of the buildings.

Sometimes order is made intentionally complex as in Habitat at Expo 67.

Long axes tend to symbolize power and control extending to the limits of the horizon, as in any view of the Capitol in Washington, D. C. It is questionable whether this is an entirely appropriate symbol for our democratic society, but it does express the power of the nation and it is so embedded in our consciousness and history, it is unthinkable that it ever will be changed.

What is needed at this time is the search for visual forms which are suited to our way of life and our world as we understand it. We must develop symbolic forms which will make our cities comprehensible, which will reveal the forces at work in our cities, and which will shape them in accordance with a humane set of values.

Certain conventions may have to be developed to create a visual language for cities. A hierarchy of uses must be defined. The effectiveness of a system of urban design can be tested through the methods of behavioral science, through interviews, analysis of behavior recorded by motion pictures and still cameras, through experimentation with perception and visual understanding in real life situations.

Such a program would remove much of the uncertainty, arbitrariness, and misunderstanding concerning the proper role of urban design in the development of cities. Thank you.

CHAIRMAN GLASSMAN: Thank you, Mr. Bogen. We would like to get as broad a discussion of questions as possible. The committee has suggested that each group concentrate on two questions.

(Applause)

At this point participants break up into smaller sessions to discuss the following questions:

1. Are there any relationships between the culture of a society, including its basic beliefs, and the design of the environment? The voyager approaching New York City from abroad has often observed how "symbolic" the skyline is of our materially oriented nation. For some, the skyline represents an aggressive, competitive statement about the nature of the American society. For others, it is a romantic statement about the power and triumph of technology, and the success of pioneering efforts to expand the frontiers of civilization. Probably all of these are true to some degree. Can you trace the decision-making process, or lack of it, in our society as a whole, and in government in particular, which has led to these urban forms?

2. What steps may be taken when two legitimate values come into conflict? For example: discuss the building of high-rise apartments on Commonwealth Avenue, or the construction of the MDC highways over the Fens. The pressure to construct high-rise apartments is created by a limited tax base in the city of Boston, and the need to expand the base in as many real estate locations as possible. The conflict arises when one of the selected locations--that is Commonwealth Avenue--is also one of great historical worth and provides continuity with the past for the citizen of Boston, What role does systematic decision-making play in making a choice which may resolve this conflict?

3. What does the city's image mean to you? What does the city's form actually mean to the people who live there? To pursue a systematic, analytic course in arriving at the answers to these questions may be vexing. What do we really know about the way people see, or how most people comprehend their environment? Can we devise meaningful tests to determine those areas in our environment which are vivid and memorable for the city dweller, and, once devised, can we utilize the results in an innovative manner?

4. Is there any essential conflict between being concerned with visual form and environmental design and being concerned about other pressing problems such as poverty, racial tensions, crime,or war? It has been said that to be concerned with the design of our urban environment at a time when there are questions of life and death to be faced in the city is comparable to confronting a starving man with a new suit of clothes. Professor Gyorgy Kepes at a recent symposium held at the BAC observed that those societies in the past which have been sensitive to their physical environment have also been sensitive to the life and culture within it. And those societies which have been insensitive to the physical arrangement of their world have been equally insensitive to the life and society of their time. Can this be interpreted to mean that a society which decides that good design is too expensive, will also decide that it is too expensive to eliminate poverty, crime, and other social ills?

5. It has been said that public housing has failed for at least two reasons: 1) it has been conceived as a charitable occupation of government and 2) since government funds have been used to benefit the minority, it would be politically expedient to express the frugal use of those funds. Is this the image public housing conveys to you? What are the aspects of public housing design that have symbolic impact, both for the occupant and for others in the city? What role can the non-design oriented decision-maker play in contributing to the image of public housing?

PLENARY SESSION BEGINS.

MR. BOGEN: Rather than answering questions, unless someone really has a burning question that they want to ask me, I would like merely to act as a moderator and invite comment by the various groups who have discussed the questions distributed to the workshops. And if there are no questions of me, I would like to begin with question one.

Does anyone have a summary of the discussion of his workshop that he would like to give just to start the ball rolling and then we will invite other comments.

MR. SOTER: My name is Angelo Soter and I am from the State College Building Authority. The question I am answering is question one.

Our group agreed on both subjects that we discussed. There wasn't any diverse opinion. Our answer to the question was that at the time that the decision was made for New York City to go high rise, it was attributed to the man who built the first skyscraper, someone said it was the Singer family. I think he started a trend that is widespread in many, many cities throughout the world copying New York as far as high rise. That is, in the Western Hemisphere. The decision could have been that in the area of Manhattan, a small amount of land, the foundation was desirable for high rise, and that was the motivating decision. Also, by going to high heights, skyscraper heights, it represented a monument to the family strength and beauty.

MR. BOGEN: Was this pretty much the line of discussion in the other workshops? In the case of New York City, were the reasons for the forms that we see there only economic and things relating to the particular geology of Manhattan Island which permitted such high structures?

We know that the growth of New York initially was due to a great deal of mercantile trade in the Port of New York. However, today's image of New York is as a headquarters city. When people view Manhattan Island and look at those towers, they think, in many cases of the national organizations which are housed there devoted to selling everything from whiskey to philanthropy.

Now, those forms that took place creating this headquarters city in the way I spoke of, symbolic form; the form really could be intentional or unintentional. The invisible hand of economics can create a form which still has human significance. However, this is only one part of the culture. There are rather different values in American life aside from the acquisition of wealth. Have any of these entered into the building skyline of New York?

CHAIRMAN GLASSMAN: One of the points my group touched on is whether the factors were purely economic or whether they were a question of image. Was the Chrysler Building built higher than the Woolworth tower purely for questions of economics, that they needed so many stories, or were they trying to create an image, either a company image or a city image, or was it a question of giving a particular importance to that type of structure?

Then another discussion we had on that particular question was whether the decision-making process in this case was a commercial discussion by a particular company, similar to a company deciding now whether it is going to build in the outskirts.

Now, this decision by private companies affects decisions that the governmental decision-makers have to make, decisions as to transportation systems, growth of public transportation, and also, if you are going to locate in the suburbs, a question of water, sewerage, and things like that--regional planning. It also touches on water pollution, air pollution, and that type of question.

A third factor that came up in the discussion on this particular question is whether a city has a particular image. I mean, is it important to walk into Boston and feel that you are in Boston? And does Boston have this? London has this feeling; whereas, as you pointed out, Newark, for instance, doesn't have a particular image.

Now, are these important factors? Would you want to comment on any of these?

MR. BOGEN: I think this question of whether whole cities--Boston, Chicago, San Francisco, and so on--have a particular total image is an important one. If there is some kind of image, and there seems to be, because many people comment on this kind of thing, what creates this image? Is it something which is really related to the whole city, or do people pick out certain landmarks?

Take, for example, the Golden Gate Bridge in San Francisco, or the Loop in Chicago, or Copley Square in Boston. Which is it? Do people when they think of the character of a city, consider a whole series of images or a total image?

MR. GLOVER: I am Edward Glover of the General Services Administration. I think that most people when they speak of an image of a city think about one particular landmark or a series of landmarks. Boston people think about the Freedom Trail, Bunker Hill Monument, and the Boston Common, and I think a city has a certain item that is the image, that creates the image that a stranger would get or would have of that particular city.

MR. SIMS: I am Alvin Sims of Crosby, Fletcher, Gilbert and Sims. I think it is an ever-changing pattern of images that remain in our minds. San Francisco before the Golden Gate Bridge was probably Nob Hill. You have the image of San Francisco in the late 1800's during the Gold rush period. Now, it is a composite of all these things; it is ever-changing, and the concept of San Francisco twenty years from now surely won't be the same as it is today.

MR. BOGEN: One thing that I didn't touch on at all, but which does relate to this particular question, is that the concept of the city as an organic whole has changed. Some people say that we shouldn't think in terms of, let us say, the City of Boston but we should think of the entire metropolitan region, and yet even the metropolitan region stretches out beyond and it is linked to other cities. Can this kind of thing be shown by any visible means so that people can grasp it as a whole? Your group didn't go into this aspect of it?

CHAIRMAN GLASSMAN: No, we didn't touch on that.

MR. KUSSMAN: I am Fred Kussman, Executive Secretary of the Designer Selection Board. This is probably a minority report. We looked at a different aspect of question one. We asked the question, what caused government decision-making, and we came up with a conclusion in defense of government, that decision-making by government was created to have certain standards and eliminate chaos and to perhaps, if I may say so, prevent designers from creating memorials to themselves and to bring home projects within the funds available. We feel that, on the minority basis again, that decision-making in government is caused because of criteria through the years, but there may be others in my group who might wish to add to that.

MR. BOGEN: Would you discuss the kind of criteria which might be employed?

MR. KUSSMAN: It was too general to get into specifics.

MR. BOGEN: Were there other people from that group?

FROM THE FLOOR: I am not in that group, but I am probably a minority report, too; but if you take a look at the city of New York, you see it growing because of need. You need to have space to do some things you want to do in a city, and the buildings took the form in terms of how much could we afford to buy of the space we needed to build a particular office.

There were some lighthouse structures that went up like the Empire State Building, but we haven't seen anybody try to make one bigger. We have seen quite a few people try to make them a little prettier, a little better, a little better space design, but if you trace what happens in zoning, you trace the fact that zoning wasn't accepted as a means of controlling growth in a city for about twenty or thirty years. We people who advocated it were turned away and then, you see, zoning began to be an accepted fact and then the rules of zoning were, in a way, locked in. They lost their flexibility and ability to change with the needs for new designs because the designs didn't follow the old patterns. The architect and the designer moved ahead of the zoning law and this is usually the case anyway. Social society moves much faster in terms of its design of need, while law lags behind most of the time.

As you look at it today, you see that the Federal Government has usurped the local governments' tax powers and on the basis of this, the cities cannot plan by themselves without using the Federal Government's money. It is a shame that this prime fiscal decision was made long ago, say, twenty-five or thirty years ago when we decided that the withholding tax would go to the Federal Government. Now you play a game of in-chess at the state and there is a failure to provide the kind of funds a state and a city need to do the job that it has to do in planning and in redevelopment.

But the job is too big anyway and priorities have to be set. We need to begin to set priorities in terms of what we can do in renovating and remodeling the cities.

FROM THE FLOOR: Going back to support Mr. Kussman, I think probably one of the reasons that government stepped into the particular picture probably as much as it did may be that the state and local governments didn't assume their responsibilities. But going further again, as the chairman said, the architects and designers are governed by a desire to design something that may or may not be a monument, but they want the best, whereas the user has to be governed by thought of economic returns and the space requirements necessary to realize these. I think that probably the decision-making in the skyline of New York was a composite of what the owner or the group who needed that structure wanted and needed in terms of space and what they could afford in terms of land area. I think we went high rise only because land costs were so expensive that we couldn't spread out. It would be almost impossible now to get as much space high rise as the Empire State Building with the wasted elevator space you have to have to get people up and down with the speed that we want today.

The group, I think, felt the decision-making process was a composite of certain zoning laws which were necessary to constrain the architect and designer to conform to both sanitary, safety, and other regulations, and the needs and the funds available for the people building the structure.

MR. BOGEN: I would like to ask you another question relating to that. Do you think that if the designer and government decision-makers worked together to develop certain criteria, that this would not only help develop greater economy of construction but also clearer and more understandable forms in the city and buildings?

FROM THE FLOOR: I think we are approaching that with the designer in government, but I think you have to bring the third factor in, that is the person who wants the building or wants the structure. You have to reach out to get him. The designer, the owner, and government, I think those three have to be brought together.

MR. BOGEN: Does anyone have any ideas as to how the owner may be brought into this? This is the unknown quantity in cases like New York City skyline, yet which really sets the image which people have of the city. Would you have government impose additional and more restrictive controls over what owners could do in building, something more restrictive than existing zoning?

FROM THE FLOOR: I don't necessarily think it has to be restrictive. Maybe it is a question of cooperation. He might get less restrictive and get this designer-government-owner team together. You might find that maybe you could ease up a little on restrictions.

MR. BOGEN: Question two deals with the problem of conflict: What steps may be taken when two legitimate values come into conflict?

MR. GRAHAM: I am Donald Graham of the Massachusetts Bay Transit Authority.

We spent the time allocated to question two to just the question of Commonwealth Avenue. We never did get to the MDC Charlesgate Project. We thought that systematic analysis of these questions and the conflict between the values could do a lot to narrow down the apparent conflicts between the two sets of values.

For example, on Commonwealth Avenue we pretty well concluded that it really is not of great historical worth. Really what Commonwealth Avenue represents is a very successful statement of an urban composition, and this is the kind of thing that will be most worthwhile preserving, rather than the concept of the Back Bay as a museum piece. On the other side, the pressures for change aren't necessarily entirely in conflict. Recognize Back Bay as an attractive accessible neighborhood and that a lot of people are desirous of having a good place to live close into town, but this doesn't necessarily mean they have to be in high-rise apartments.

So, we concluded that the challenge here really is to preserve what has been carefully evaluated as the most important of the old values and relate those to the most important of the new. For example, at the present time the uses of the Commonwealth properties are converting rapidly from single-family homes to dormitories and rooming houses and schools. That this is just as detrimental to the preservation of the composition as the deterioration of the facades and the boulevard.

And, therefore, the way we see it would be to encourage the reconversion of those buildings to their original uses as would seem to be consistent with providing good housing close in. Also, in recognizing the economic need for providing for high-rise apartments, conceivably along Boylston Street, along Beacon, or in other spatial relationships, the special quality of Commonwealth Avenue would be preserved, not as an historical site of any kind, but as a visually very pleasing composition. It could be encouraged to become even more of a residential street than it is at the present time.

MR. BOGEN: Thank you. In developing this answer to the question you are implying that the preservation that you speak of, of the character of Commonwealth Avenue,is not something which is static in nature; it involves a process over time?

MR. GRAHAM: Right.

MR. BOGEN: Mr. Eisenberg.

MR. EISENBERG: In group four, the discussion centered on the problem of Commonwealth Avenue which stemmed from the social problem--the change in the character of the residents on the Avenue and the general deterioration of the buildings.

From this, it was pointed out that, a systematic approach was held as far as the decision to allow high rise was concerned. There was consultation with the Back Bay Design Committee; there was consultation with the BRA and consultation with other government officials. The fact that came out was that in order to rehabilitate Commonwealth Avenue, concessions would have to be made to private developers, which came out in economic terms to allowing them to build high-rise buildings at locations that could be selected which would be the least detrimental to the character of the Avenue.

After discussing this, there were some of us who felt that high-rise buildings should not have been allowed on Commonwealth Avenue, but that one has to draw the line at some place in saying economic considerations outweigh all others.

It was pointed out, for instance, that the new proposed John Hancock building, sixty stories in Copley Square, may be terribly inappropriate as far as Copley Square is concerned. However, can you turn around and say, throw away a $120 million dollar investment for the City of Boston? Is this a place where one can draw the line as far as decision on design comes into play?

Those of us who felt that Commonwealth Avenue in its monumentality, formed a character of the city, because of its width and the height of the buildings surrounding it, felt that this was one of the places where the line should have been drawn, and that high-rise buildings should have been allowed maybe on either side of it or away from it, but not along the Avenue itself.

In a discussion, it was pointed out that in the case of the highways over the MDC lands in the Fenway, there was a systematic decision-making process, too, but one comes to the economic fact again that the tunnel system that was first investigated was three times the cost of the overhead approaches and highways that are there now, and the question is, who is going to pay for this? How would this affect the tax base?

MR. BOGEN: In weighing these questions, the stress always seems to be placed on cost, at least the monetary costs, which are easier to measure, because they come in dollars. Other kinds of costs which are difficult to measure are not considered. Benefits are not usually measured except monetary benefits. Did you get into the questions of benefits involved in alternative choices or selections of sites or permitting buildings to be built or not be built on an important site?

MR. EISENBERG: No.

MR. BOGEN: Were there any other comments on question two that anyone had?

MR. THUMA: My name is Richard Thuma. I think one thing that our group decided is that democracy is a very fine idea, but it doesn't work. We had eight solutions to this problem in trying to crystallize this.

I think it is safe to say that we felt that these decisions should be made at the lowest possible level. In the case of Commonwealth Avenue, we would have left that to the Back Bay Association. We feel that the problem was one of a scope that they could have handled and we would have yielded to any decision they made.

Conversely, we felt that the problem of the overpass in the Fens was one that perhaps should have been left up to the MDC to decide upon, because they as a function of the fifty-two cities and towns that surround the core city really have a responsibility to get people from the southernmost part of the metropolitan area to its northernmost regions, and we felt that they were representing the best interests of the greater number of people. We felt that in that instance, this was the lowest level at which that decision could be made.

MR. BOGEN: Question three deals with a city image. Does anyone have a summary of his group's discussion?

MR. KUSSMAN:
We came up with the observations that there are two types of city dwellers: the dweller for convenience who wants ready access to his work, and the dweller who has sincere and deep roots in his city.

We felt that the image of a city is in the eyes of the beholder and this covers a multitude of sins. Except for monumental structures, one sees different things in structures. One's taste is different, and this in turn is an image.

We felt that, except for Washington, D. C., the free American society has created an environmental happening that wasn't planned, and we feel that class distinction will constantly cause a difference in images. We feel that some of the people who are eventually going to escape from the ghetto areas and make something of themselves are also in turn going to be able to communicate the problems of the ghetto and the solutions to these problems to society.

They would thus help eliminate many of the present causes of the ghetto and hence bad images.

MR. BOGEN: One of the comments that you made in your statement was that the image is in the eye of the beholder. Did you feel that this is an entirely random, individual thing, or did you get into the question as to whether there were certain common tendencies or agreements?

FROM THE FLOOR: There were common tendencies in monumental structures, if we are talking about buildings, but these are isolated. Generally speaking, one sees things differently.

MR. BOGEN: The fourth question again brings up the question of conflict, but in a different context; and relates this to larger social problems. Is there someone who would make a comment on question four?

MR. EISENBERG:
Our group basically decided the city is a balanced organism and you can't ignore the social ills that make crime, etc. even at the expense of good design. There comes to be a serious question as to whether or not you can afford good design at all.

A specific example is that at one of the areas at Washington Park--the commercial area--which was conceived along with the housing areas, as an area to be used by the neighborhood, there were so many windows broken that the developer has been forced to board up all the windows on the exterior and is considering putting up a fence. And the YMCA has had so many windows broken that they have been considering closing down their rather interesting and well-designed structure because of the damage they were sustaining. This seemed to be a result of a public attitude towards public buildings, for instance as opposed to the housing projects which do not sustain this kind of rampant vandalism. The public structures, the schools and these buildings have sustained this kind of damage.

So, it was felt that while you could make decisions as far as good designs were concerned, you positively could not ignore the social ills and your good social design went for naught.

Another problem that was considered in terms of good design was transportation. Although it wasn't considered as a social ill, it was considered as one of the means for correcting social ills, and this, it was pointed out, will probably be the era for transportation. For fifty years we haven't spent any money in studying the transportation problem; now we are just moving into this field. One of the problems of the ghetto area, so-called, is lack of really good public transportation, so that they can get out to economic opportunities and to social opportunities. It was impossible, therefore, to consider good design per se in the absence of considering the problem of solving the social ills in the area where there are to be proposed buildings and programs.

MR. BOGEN: Would someone from Team Two want to start the discussion on the questions relating to public housing? Don Graham?

MR. GRAHAM: We very quickly came to the conclusion that the best thing the non-design-oriented decision-maker can do with respect to new public housing is to make sure it doesn't have an image, to make sure it is invisible.

Then we turned to a little tougher question of what to do with the existing public housing, and we agreed it would be desirable to try to eliminate the existing public housing as a symbol as well. When we got to the question of how to go about it, we recognized that we were dealing with the wrong level, that essentially the problem is a social one, a question of the recognition of the social values of the occupants and determining on a social level how best to capitalize on the positive forces that exist and discourage the negative forces --a problem which can't be solved merely in a concern for providing physical facilities, or, to borrow a phrase from question four, in talking about public housing as a solely physical entity. We tend to deal with providing a starving man with a new suit of clothes, and so, we were going to try to create a new environment around the existing public housing projects. What is needed? What makes a neighborhood attractive as opposed to another neighborhood which repels individuals?

And we found that we were confronting ourselves with dilemmas no matter which way we turned. The neighborhoods that have held up best socially seem to be those that are homogeneous social groups, which didn't seem to be the right answer either.

So, we concluded by saying that we were really incapable of coming up with a good answer to that question, other than recognizing that there are a lot of other points of view and a lot of other disciplines that have to be brought into investigating the proper solution to a question like this. Public housing is simply not a matter of providing shelter. You have to be much more aware of how important that is in a scale of the values of the occupants before we can determine how much of our resources should go into the physical dimensions of the total problem.

MR. BOGEN: Did you go so far as to suggest that the public housing concept be abandoned except for the management of existing projects?

MR. GRAHAM: We didn't discuss that in so many words, but I think we recognized that in meeting the needs of the total population it is perfectly legitimate to think in terms of subsidizing the shelter of a portion of the population, but I think we agreed that our success at doing that so far hasn't been outstanding.

MR. BOGEN: Thank you. The chairman of our workshop is Mr. Sims, and I would like to ask him if he would comment on our thrashings around.

MR. SIMS: Well, it was obvious right from the beginning that the chairman of that particular group demonstrated total inability to keep the group focused on the problem.

We wandered all around the barn. There is no question about it. I think there was general feeling that public housing as it now exists does not solve any problems other than to put a roof over some poor heads of some poor people, but that in the future there has to be a great deal more research into the motives and motivations of people who are going to be offered public housing, in terms psychological, sociological and physical.

The question was raised as to what would happen, for instance, if you took people of the lowest income group and placed them into one of the Prudential apartment buildings and, Herb, maybe you can elaborate on the reaction of the group to that?

MR. BOGEN: There were several views concerning that. One was that if the people were elderly people of almost any income level, that type of building would work out very well.

With respect to low-income families of lower-class groups (referring to behavioral patterns as well as income), we defined these low-income families as those which have income below the minimum level of three or four thousand dollars, and families which would be at about the lowest fifteen percent of the population in terms of income and in terms of class level. We had the feeling that this particular group would find that apartment building very inhospitable. This was partly because of functional reasons; that is, the separation between the upper floors and outdoor areas which would exist around it, and partly because of reasons relating to the behavior patterns and life style of the people in this category.

I had recently read some material concerning sociological studies of families of this type in similar kinds of housing, and the findings were that these people were primarily concerned about safety and security. Also, they disliked impersonality of any kind, whether it was bureaucratic procedures of housing authorities, or in shopping behavior. They disliked the kind of bureaucratic impersonality of the large department store in contrast to the personal contacts with the small local stores. Therefore, we felt that that kind of person would find that this building symbolized impersonality, coldness, control over him which he would not like, and we felt that both, because of the functional reasons, and also because of the connotations which the building communicated, it would be unsuitable.

As far as the middle class and upper middle class groups, we thought that it would be eminently suitable for them. We hope so, since I believe that this is the group that the Prudential is hoping to house, and we thought that many of these people, perhaps would like impersonality, because it would imply privacy which is perhaps what they were seeking.

As far as things other than the buildings, I believe it was John Williams who had some comments on that, based on some of his experiences in Washington. John, would you care to comment?

MR. WILLIAMS: Yes, one of the things as far as exterior appearance goes, was how much money you should spend on the public housing projects. One of the things that would make a public housing project and a high-income project different is perhaps the ground treatment around them.

This is the experience in Southwest Washington.' Someone else has brought up that there you have some public and private housing (fairly high-income) right next to one another, and in the private they did attempt to do something with the ground treatment to make it much more interesting. As far as the outsider who is driving around the place goes, if he doesn't know who lives in which housing, it is immediately obvious which one the public housing is due to its lack of landscaping. The values of having a decent treatment of the ground surface is to make a better place for better living in the project.

MR. MARLOW: I am with the Office of Education, and I thought I would like to say something about public housing. I have been associated with it or was associated with it for almost eleven years in New York, which I think is probably the roughest area in the entire United States.

However, I don't think it is entirely a failure. I think that a lot of wonderful people do live in these projects. I know lots of projects that are very good, and when I say good I mean they look good inside and outside. There are some of them that are wrecks, and when I say a wreck, I mean a wreck. I have photographs to show it and show just what it is. I feel that they research and they do many other things, such as find out what kind of troubles these people have and what you can do to help them, but somehow or other, I think those have all been failures. I say they are failures because my association with the people has been on a very, very intimate level, not that I have lived there, but I had very, very close contacts with them. Many of these people are discouraged. Many of them have no hope, and many of these people are good people. If somebody showed a little bit of interest, I think it would raise them to a point where they would try to help themselves. There are a lot of people who live in housing projects as a way of life. There are three and four generations of the same family and they get married and they live in the project, too, and it goes on and on. This has caused a great deal of disgust among many people in the country because they say it is the taxpayer's money, but one thing that has been brought out here is that public housing is self-sustaining. It pays money back; millions of dollars are returned to the government; nobody says anything, but it is true.

I think that public housing is not a failure. There is a political vein throughout all these projects, and I suppose it can't be helped. I say that, and I mean I suppose it can't be helped. It can. Things are not being done the way they should be done. In other places it is being done.

I happen to see one gentleman here, Mr. Glassman, who knows me. I think he can speak of some pretty good projects. I think he has built some of ours, and others who have designed them and have done a very good job, and they are very good.

But, I find that the main detriment in most of our projects is the maintenance problem more than anything. Not only do you need the people who run the project to figure out a better, safer, more efficient method of maintaining the place, but at the same time if they could raise the spirits of the people who live there a little bit more, I think that these places would be good places to live in.

MR. BOGEN: Thank you. I can see three people have had their hands up. I am going to start in the back and move forward. Paul Carroll.

MR. CARROLL: Along the same vein of management, it was mentioned that the project in the YMCA had a lot of broken windows, as did certain of the shopping centers. I had some information that came to me as to why the windows were broken. Apparently the history of it is that the day after the YMCA decided to lease its building out to the university because of the excellence of its pool, thus depriving the neighborhood children use of the pool, the windows were broken. It is interesting, and a lot has been erupting more recently due to the expenses of living in slum areas through the higher cost of medicine and higher cost of groceries. It may be a reaction, and it may be a healthy reaction to these things here, because sometimes we are too casual. What are we going to do, build walled forts within these areas?

There may be again lack of management, but if we look into the reasons behind some of these happenings, I think it is worthwhile. Instead of just building up another Federal standard saying no windows, we must analyze why these things happen.

MR. BOGEN: Well, it is obviously a very complex problem involving more than just the physical design of buildings.

MR. COLLINS: My name is George Collins, and I was lucky enough to be involved in a demonstration city built in the early designs in Washington, and we have evaluated housing and some other problems we had relating to the integration of schools. These problems are all mixed up in this, and one of the clear facts that came to the committee two years ago is the fact that we hadn't designed a multiple approach to housing. Everything had been low-income or everything had been middle-income, and everything had been high-cost housing. I think in the future, if we are looking towards something that is going to satisfy the need, we need to look to multiple approaches.

Certainly we still need housing in certain sections to be low-income and to be integrated as it is, but there are also opportunities for integrated housing, and I am talking about the integrating by income, which is probably one of the most important factors we face today in schools and society as a whole. There is a breakdown of the old city, and the old city had more socio-economic integration in it than it now has. I don't think we did a very good job in this. What we are saying about public housing is that the old public housing with poor facilities needed a great deal of maintenance and was not good, and that today we are looking at better materials with longer-term use and less public maintenance that will stand the test of time. We are also putting a little beauty into these things, so they will make people who have a feeling of pride live in these particular things.

I think we have made errors and we are now looking toward finding what we need to do for people in addition to providing shelter in a brand new house that has poor facilities.

MR. BOGEN: I think that our workshop group also felt this was extremely important. Don Graham?

MR. GRAHAM: To support the statement of the gentleman from New York, one thing that we brought out in our discussion is that actually there is a hierarchy among the public housing projects. The oldest projects seem to be surviving the best, and we use as examples a project in Malden, and the Old Colony Project in South Boston. These really are prestige projects, and so it is not entirely outside the realm of public physical design of housing projects. Back in the nineteen-thirties there were more liberal standards, more opportunities for the architects to use initiative and ingenuity in providing good housing design, and this housing has survived quite well over a period of better than thirty years. And if there is any question about that, you can actually go out and look at these projects. The fact that they have been providing housing for low-income families for that length of time does indicate that it is possible to provide good housing.

I think we do run the mistake of looking at the Columbia Point kind of project and equating that with the whole institution of public housing, and we tend to become over-critical by pointing our finger at perhaps the worst examples.

So, I think we should take a lesson from the comments about the New York program. Certainly a lot of families have been provided with good housing through the public housing program. In efforts to improve the physical dimensions of the program we must not be too critical of the total institutions which for many families have been successful.

MR. BOGEN: In the case of Old Colony, if I remember that project correctly, it doesn't have the isolated location of Columbia Point, and also it has a very domestic scale which Columbia Point lacks.

FROM THE FLOOR: Talking about the South Boston project, I was operations engineer for VHA and I have been there many, many times. The only fault I found with that particular project was that in its design they had openings through their basements, and whenever anybody stole anything the police had a hard job to catch anybody because these boys knew that whoever did something out of the way, they could get away very easily. It has come a long way and, as he brought out, it is thirty years old. In fact, to the best of my knowledge, that was the first low-rent housing project in the United States.

FROM THE FLOOR: I think it was the first one, a very good one, too. At Columbia Point, one of the things that bothers me is that I can't understand why a massive effort isn't being made to knock off those rats that are tearing down the walls. They must be juggernauts to be able to rip out the brick work of the foundations. There is something wrong there, and I don't understand it.

MR. BOGEN: Thank you.

(Whereupon, at 5:15 p.m., the workshop was adjourned.)

TRANSPORTATION SYSTEMS

The third Workshop on "Environmental Design for Decision-Makers in Government" convened in the Boston Architectural Center, January 9, 1968 at 2:15 p.m. Subject, Transportation Systems. Speaker, Dr. Aaron Fleisher. Mr. Herbert Bogen, Chairman, presiding.

CHAIRMAN BOGEN: The topic for the third workshop in our series today is "Transportation," and we are very pleased to have with us as our third speaker, Dr. Aaron Fleisher, Professor in the Department of Urban and Regional Planning at M.I.T.

DR. FLEISHER: Mr. Bogen, gentlemen. Let me say what I should like to accomplish in the next hour. I want first to discuss what I think is the transportation problem. I then should like to discuss the present developments in technology that bear upon this problem, and in the third part of the talk, I should like to concentrate on one particular development that I think is rather promising.

First, what is the transportation problem? And since I have only an hour to talk about this matter, I am likely to be more emphatic than I really mean.

I shall say first what I don't think the transportation problem is; I don't think that the transportation problem is basically one of congestion. Congestion is a reasonable, normal way to price the cost of the trip. If you attempted to devise a transportation system where there would be no congestion at all, you might find that you are devoting the larger part of the gross national product to that service than is reasonable even in an affluent society.

The urban transportation is also not the question of the survival of the central city. One hears such phrases as, "the central city or the city is decaying," or "it is strangling," or "that it should be revitalized." Let me say rather brusquely, I think that mostly nonsense. There is no reason particularly to maintain the central city if the central city is not maintainable. As far as the tax base of the central city is concerned, I see no reason why the whole metropolis should be arranged so the central city can survive from a rather inefficient, unjust, form of taxation. If the maintenance of the central city is a good policy, then it is much more intelligent to change its tax base accordingly, than it is to attempt to hold activities there that no longer belong.

I think that the way cities are developing is an expression of the way people want them to develop. For perhaps the first time in the history, we may be observing a set of locational opportunities that are choiceful, or if not choiceful, then choicy, rather than choiceless. And I think that most of us are taking advantage of such choices both in the places where we locate our homes and in the places where we have our businesses. To ask that the central city remain as it was is asking for an obsolescent form of a city.

These are what I think the urban transportation problem is not, which is not to say that the congestion is unimportant, or that central cities are unimportant. Those are separate issues.

What then is the urban transportation problem? Although congestion may be desirable as part of the pricing mechanism, there is still a question of the level of congestion at which to operate. Too much makes the city unproductive; too little makes it very expensive.

Let me examine the various modes and kinds of transportation systems so that we can see what we might be able to do to increase capacity.

Take the expressways first. Obviously you can increase the capacity of the expressway by increasing the number of channels. If you increase the number of channels of the expressway, you can cram more people on them. This is one way to do it.

In our present ethics, this is getting to be more and more unpopular. Let me cite the controversy over the Cambridge Inner Belt. We have now reached the state where the simple statement that we need an expressway is not sufficient to justify it with no further ado. I think it is high time we began to question this, and it is most refreshing that Cambridge took such a strong stand on the Inner Belt. I think the value of its stand is likely to be widely felt. Whether we get the Inner Belt or not, and whether it turns out to be the right thing to do, is far less important than the fact that the substance and procedure of the decision was questioned. It appears that increasing the number of channels on expressways as a device for increasing capacity is beginning to push against a limit of acceptability. By what other ways might you increase the capacity of the expressways? You might divert trips to other modes, and usually one argues for the justification of public transportation systems on the grounds that they will turn users from the expressway. It is true, but also one must hasten to point out that this is very, very limited in its effect. Consider, for example, the expressway that is now being built for the San Francisco area. The builders hope and they will be quite pleased if they attract approximately ten per cent of the expressway users. Now, ten per cent skimmed off the highways, is a relatively small number and will not change the required capacities very radically.

The fact of the matter is that the automobile, as a mode of transportation, is highly desired. It is quite cheap and very, very convenient most of the time.

The third way of correcting the under-capacity of the expressway is by distributing the city over a larger area than it is now. If you disperse the city, then you will need many roads, and you do have many now, none of them very high capacity. I don't know that there is much else one can do to increase the capacity of the expressways.

Let us pass on to another kind of channel, the arterial streets. It is important to point out that the ratio of arterial streets to expressways is ten to one. You have many, many more arterial streets than you have expressways. How can you increase the capacity of the arterial streets? In our conversation at lunch today we talked about the November 15th fiasco (freak snowstorm) in Boston; this catastrophe occurred at places like Massachusetts Avenue, Storrow Drive, Memorial Drive. These are arterial streets. What can we do about them? You can divert traffic from them by building more expressways, but then you are back in the sort of awkward situation that you were in before.

Can you use public transportation to divert traffic from the arterial streets? It is rather doubtful. Public transportation is very efficient on the line haul and is thoroughly inefficient for collection and distribution. The automobile does that much better.

The numbers, the kinds of trips we make in the city are generally very short. I think the length of the average trip is about three miles. Five miles is a long trip, which says that most of the trip time is spent milling around not very far from where we started, and it is for this reason the arterial streets are so necessary, and also for this reason they are difficult to replace by other means.

You can improve the arterial streets by the use of traffic control and channeling devices At M.I.T. one of our students posed the following problem. Take two points, an origin of heavy community traffic and a place on the highway where thi traffic is headed. If I can sort this traffic and give a man, when he picks up his car, a little map which tells him what route to take, how much capacity can I get out of the city streets than I had before He estimated a twenty percent increase in capacity simply by directing the flow on the city streets.

I don't know how this sort of control is imposed, nor do I know how acceptable it will be. I think it demonstrated that there is a feasability in improving the arterials that we haven't yet considered. That is one way to improve the capacity. There must be others.

It appears that you can increase capacity on the expressways a little by substituting public transportation. You can get a little bit off the arterial streets by substituting public transportation and somewhat more by using control devices. Public transportation by itself doesn't solve any large problem, except in very dense places like the central city.

If one looks at the rate of growth of the central cities as compared to the suburbs, then the central cities on the average are just about maintaining themselves at their present state. Most of the urban growth is taking place outside the central cities. This is not only growth in residences, as you would expect, but in employment, in industry as well. The only kind of employment that is growing in the central cities is service employment. The urban transportation problem is not one problem; it is many problems. It is the problem of the commuter. It is the problem of the woman who is trying to go shopping and trying to take her children to school, and it is the problem of the poor people trying to get around. This is one aspect that is hardly mentioned at all. It is a problem of not just the poor, but it is also of the young.

Perhaps the teenagers have a perfect right to object to being buried in the suburbs, and they might like to move around, and they can't unless they have a car. We prevent them from traveling with an automobile unless they are eighteen years old, and then we charge them or their parents an enormous tax for the privilege of traveling that may not be justified. The accident statistics for teenagers have been questioned. What appears to be the case is that the incidence of accidents among teenagers is not due to their immaturity or emotional instability, but simply that they haven't had very much practice as drivers. You can correct that quite cheaply. Nevertheless, one might be very much interested in devising automobiles or devising vehicles that don't require very high skills of driving and cannot be driven in a way that makes them dangerous either to the occupant or to the people outside. This might help not only the quite young, but might help also the people who have a physical disability and the people who are old or who simply don't have the strength or reaction times necessary to drive cars at somewhere between thirty and fifty miles an hour.

We have come away with the impression, or at least I have come away with the impression that there isn't very much available right now that will help to increase the capacities on expressways or on the arterials, or that conventional forms of public transportation can contribute very much.

Now, let me take up the second theme of these remarks; namely what might technology offer!

For the purpose of discussing technology and technologies, I think we can divide the transportation system into its components: the vehicle, the suspension, the guideway, and a source of intelligence.

Let me illustrate what I mean by these words. Take the rapid transit trains; the vehicles are the trains, the suspension is the wheels, the guideways are the rails, the intelligence is the driver.

What you see in the development of technology for transportation are different advances in vehicles, in guideways, and in suspensions, and in control. Suppose that you would eliminate the driver. Man as a driver has demonstrated large limitations. If you would like, for example, to increase the capacity by decreasing the headway, that is, by bunching trains or vehicles closer together, then before long you run into the human limits. It is no different to design an automatic guide which does it better.

One use of technology is simply in taking the control of the vehicle away from the person and putting it into an automatic system. This does nothing more than increase the capacity of the system as such. It doesn't change the essential characteristics of the system. The line haul system remains a line haul system, and making the distribution system automatic is much less likely because one of the consequences of automatic control is the necessity of having an exclusive right of way. I do not think that we can expect, in the next twenty years, to produce a vehicle that can safely roam the city streets without a driver. Let me repeat, for it is quite important; if you have automatic control, then you must have your own right of way.

Let us consider now some suspensions. The Westinghouse system, for example, substitutes rubber tires for steel wheels and makes a lighter train. It is under automatic control, but basically it is nothing more than our old elevated. There is another kind of suspension that has been suggested; the air pad. This one keeps the vehicle just above the track by mounting it on a bearing that is essentially compressed air. This permits higher speeds. You pay for these higher speeds, because the guideway tolerances have to be closer and the turning radius higher. Our problem in the city is not speed. We are quite content to travel steadily. It is the stopping and going that we find so irritating. Air pads do not seem to have any high applicability to the urban transportation problem.

What about the guideway? It is a mode of control, and does not affect the form of transportation. It is simply an exclusive right of way.

Another range of variation is the place of the power source. It can be either in the vehicle or in the guideway itself. If there is a third rail, then the power source is in the guideway. The automobile carries its own power source. A linear induction motor is nothing more than a different motor, a different power source to move the vehicle. It does not change the mode of operation.

Now, I think that all the technologies that you might mention fall in the category of doing something about either the bearing surface, the guideway, or the vehicle, and what you get in various proposed transportation systems and different combinations of this.

For example, the monorail is nothing more than a train on one rail rather than on two. I don't see any particular reason why one rail should be necessarily so much better than two. Its performance is approximately the same. I don't see that there is automatically any magic in the monorail. In the same way you can make many combinations of the vehicles small or large.

Whether you make your train of small vehicles rather than large vehicles, you have the essential characteristics of the train. If you substitute electricity for gasoline motors, then you have the advantage of the side effects of non-pollution, but again you are dealing with essentially the same vehicle, whether it is the automobile on the road or a separate vehicle on a separate channel. If you assess the various kinds of technology in this way, you find that the range is very small, and I think we wonder why in this age of great things there is such a rather pitiful range of alternatives to existing transportation facilities. I think in part this can be accounted for by the amount of money spent; real money spent on research and development in transportation has been small, almost nothing at all.

Now, let me describe the automatic highway or the guideway; (it is called the auto guideway) as a particular kind of technology and why I guess (and I am using the word guess very literally) it shows the greatest potentialities.

Most of the developments in the technology of urban transportation are, I think, essentially limited to the line haul part of the problem; it is the part of the trip that takes you from the expressway near your home to the expressway near the place where you work, if you use the automobile for commuting, or it is the train station near your home, the train station near the place where you work, if you take public transportation for commuting.

It is very rare that technology considers the part of the trip from your home to the train station or from your home to the expressway or from your station to the other end of the expressway and exit to the other way, to the place you work or shop or your ultimate destination. For very good reasons, these parts of the trip, the collection and distribution ends, have been pre-empted by the automobile, and the automobile does very well with them most of the time.

The defect of the automobile is not that it doesn't do it very well, but that there are occasions when it does it rather badly. And the occasions that it does it badly are the occasions that occur because our highways have a smaller capacity than required, and because too frequently the automobiles cannot be properly stored. Part of the inconvenience of the automobile is that you don't know where to put it when you get through with it. If you could make a disposable automobile, I think you would solve the problem right away.

The automatic highway would like to take advantage of the automobile as a distributing vehicle at the two ends of the trip and combine it with the line haul vehicle in between, thereby eliminating the transfer from one vehicle to another or from one mode of transportation to another. The transfer is an awkward part of our trip.

It wouldn't be so bad and we wouldn't mind having to stand if we could be assured that once on we could stay until our destination; but this is rarely the case. What we find we must do is transfer to another vehicle somewhere in the total trip. The automatic highway people propose this. You can use your automobile near your home to get on the expressway, but once on we take control away from you and vest it in the guideway itself. In doing so we can then increase the capacity of the guideway without increasing the number of lanes, because then these automobiles can be run at speeds somewhere between forty and sixty miles an hour (they usually quote sixty). The guideway will take care of all the mergers, all the entrances and exits. The guideway will maintain the headway that is required for you. You can sit back and enjoy the ride. Under these conditions the capacity of one channel is somewhere between six thousand and eight thousand vehicles per hour, which is equivalent to something like a six to eight-lane highway. You have the following advantages; the use of your vehicle in the place where it belongs near your home; the use of public transportation, namely, the guideway in the place where it belongs; and the much higher capacity of the guideway; the non-necessity of the transfers and the privilege and convenience of your own vehicle on the guideways.

Let us assume that that technologically is feasible. I say assume, and I mean it quite literally. It is not at all clear that you can do this with sufficient safety, sufficient convenience, and at a reasonable cost. These are matters which still need a lot of work. What we want to do is now look at those aspects of the public transportation problem that might be solved with this scheme.

What does the guideway do for you? It doesn't do anything at the low density end of the trip. And that is all right because at the low density end of the trip, things are not so bad, provided you own an automobile. This doesn't help the man who doesn't own an automobile, unless you are proposing to attach also some sort of transportation facility which is public with respect to the vehicles. It may be possible to extend the guideway to public transportation, but that would not help the old, the infirm, the young and the poor very much.

It doesn't do anything for you if you aren't rich enough to own an automobile. It doesn't do anything for you at the low density end of the trip. It helps very much on the expressway. What does it do for you if your destination is the high density end of the trip?

Let us speculate about that. If you intend to use your vehicle for the purposes of distribution at the high density end of the trip, then you will want to leave the guideway and you will want to be able to roam the streets and find a place to park your vehicle. It might not help the parking problem at the high density end. In fact, it may make it very much worse because in making the trip from your home to the central business district, for example, so convenient, you may in fact increase the numbers of vehicles pouring in. This is not necessarily bad, because it looks, if you examine the trips into central cities, as if the controling factor is not the length of the trip or the convenience of the trip, but the cost and convenience of obtaining a parking place at the other end. If there is no change in parking, then that itself will be the governing mechanism by which to control the use of the guideway to take your private vehicle into town. When you may not be using the guideway to its full capacity, you begin to think about ways of getting around this. One way is not to take your vehicle off the guideway at all.

What you can do is leave the guideway without your vehicle. If your vehicle remains on the guideway, then the possibilities of storage are rather larger, because the same mechanism that took you from Lexington, let's say, to Kenmore Square might also work to take the vehicle back to Lexington or if not to Lexington, then somewhere in between Kenmore Square and Lexington for purposes of storage. The guideway then offers a possibility for a much larger storage of vehicles if you are prepared to leave your vehicle on the guideway itself.

If you do that, then you must pay a storage cost. I expect it will be rather higher than the price you pay for the downtown garage, because you raise another problem when you store your vehicle on the guideway. You have got to retrieve it, and in order to retrieve it you have to signal for getting the vehicle you want and signaling for the particular one you left, namely, your own, might turn out to be complicated. It is not impossible, but it is complicated, and therefore may be expensive.

There is another possibility. Suppose you give up the option of owning your own vehicle. That is not unreasonable. We have rather strict tastes about what we own and what we rent. For example, you will never think of renting a toothbrush, and we take dim views of renting a wife, but we have no compunction at all about renting skis or renting a car, or renting an airplane. We are rather more fussy about renting clothes, but we occasionally rent a formal evening wear.

I suggest that renting a car is not unreasonable. If you rent your car, you help the storage problem immensely. The one you pick up doesn't have to be the one you used before, and its use can be shared. We may well be on our way to a situation where the second car in the family is the rented car rather than the owned vehicle. It is still not likely to be cheap. But what happens to you as a person when you leave the guideway and want to get to your destination which may be a considerable distance from the guideway? If the guideway has the capacity of six thousand vehicles per hour, or even if it is four thousand vehicles per hour, then one channel can take care of an enormous amount and, therefore, the density of channels is likely to be quite low. That means when you leave the guideway it is more likely than not that you will be a considerable distance away from your ultimate destination.

Therefore, the guideway poses the distribution problem at the high density end that it does not contribute to by itself. It looks as if the guideway remains essentially a line haul system, and you have a distribution problem at one end or the other, and your distribution becomes the typical one that exists now.

There is another side effect of this high channel capacity: If the channel capacity is very high, as I said, then these guideways are likely to be rare events. You simply don't need many of them. If they are placed too closely, they become redundant. If placed at a distance that represents their optimum usage they will be much further apart than our present expressways which means you might have to travel a considerable distance to get to them. You may begin to weigh whether you want to take the trip to the guideway for the sake of the guideway trip, or whether you want to wend your way through the city streets. The guideway represents a drainage ditch for a very large area and sometimes it might well be more efficient to have several small drainage ditches than one large one. But the ecomonies of scale do not appear unless you operate at high capacity.

Then there is the question of the adaption of the vehicle to the guideway itself. As the guideway is thought of now, there is an arm that comes out of the vehicle that rests on a rail. This arm really isn't doing the guiding. But in order to make the system fail safe you have to have a certain amount of redundancy and therefore, this mechanical arm.

Secondly, the vehicle on the guideway is run by electrical power. You have the investment in the arm that sticks out and the electric motor in the trunk of your car and the whole thing might cost anywhere from one dollar to one hundred dollars depending on whom you talk to. Will people make that investment, and two, if they do make this investment, at what level of usage will they make it?

Let me illustrate that point. Suppose there were ten other families in the whole metropolitan area who owned telephones. Would you be interested in purchasing one? Not very likely. The telephone is attractive only if you can make enough calls which is not very likely if there are only ten other users around. The guideway is that kind of thing. If the guideway, as it starts up, is very sparse, say it only goes between one, two or three points, you might not make the investment in your automobile simply because you don't use it enough. How do you start it in a way so you can get enough places to use it. And, how much will the additional investment in the car be in order to make it acceptable. There is a third problem. If you are using your car on the guideway, you require a higher level of maintenance than it would have to travel on the city streets. If your car breaks down on the guideway, it becomes close to catastrophic. If you break down on the street, you can leave it there for a little while, or forever. Can this maintenance level be expected of used cars?

Now I am sure that I have not thought of all the ins and outs and ups and downs of the advantages and disadvantages of the guideway, but I have said enough to provide substance for speculation.

The automatic highway is a solution in search of a problem, and I think it is important to decide what part of the problem it solves and whether that is the part that is important and if that is the way we want it solved.

Let me stop here. We will meet, as I understand, an hour from now, to discuss these matters in concert rather than solo, Gentlemen. (Applause.)

At this point, participants break up into smaller workshop sessions to select and discuss one or two questions from among the following:

The guideway is an automated highway that has a capacity of about 8,000 vehicles per hour at a speed of 60 miles per hour. One channel measures about 10 feet in cross-section and requires an exclusive right of way. Vehicles on the guideway are under the control of the guideway. On entrance they have only to declare their destination. The rest of the trip is under automatic control. The vehicles themselves must be specially equipped to be compatible with the guideway. In another version of the idea, they would require no modification but would ride on standard pallets instead.

The guideway itself is equivalent to a superior rapid transit system with the added advantage that its vehicles can leave and act in a conventional manner on conventional streets. Transfers are eliminated and the collection distribution and line land trips are packages in one vehicle.

1. However intensive, not all the properties and components of the guideway can be tested in the laboratory. The complete performance of the guideway as a system can only be realized in vivo. Testing the system therefore becomes part of the problem of starting it up.

   a) What properties of the system should be tested and what priorities should be assigned to these tests?

   b) It is possible, after all, that the system might fail its tests. How would you start developing the system in order to make the tests adequately with the smallest investment in the system itself?

   c) What experiments would you perform and what data would you collect in order to control and understand the tests?

2. The guideway is essentially a personalized rapid transit system with an especially easy procedure for transferring between public and private mode of operation. If you could build a guideway network for th Boston metropolis, what would you recommend? The network should serve these purposes:

   a) It should distribute transportation to those places where it is lacking;

   b) It should relieve congestion;

   c) It should reroute traffic where it is oppressive.

Following are some of the considerations that would enter in making the network:

- To what extent can existing rights of way be used?

- Where should the stations and the entrances of exits to the network be located?

- What should be the proper balance of guideway and conventional highway?

3. Vehicles make their way into the central business district via large arteries. It is easy to overlook the substantial numbers of vehicles that trickle through the CBD via the streets. If the guideway should be adapted then it will be possible to deliver all the vehicles converging on the CBD at a relatively small number of places. To avoid a monumental jam some controls are necessary. Various ideas have been suggested:

   a) Since the destination of a trip must be declared upon entrance to the guideway, this declaration can be used to limit the number of trips to the CBD.

   b) At the CBD permit only the person and not the vehicle to leave the guideway. The vehicle is then moved to a parking area or garage, or if it is rented, to another user.

What is the feasibility of these suggestions? What are the advantages and difficulties of the idea of rented vehicles? Can you devise any other ways to manage the problem?

4. If the guideway proves itself then it will represent a very efficient form of transportation, decreasing the frequency and intensity of congestion, and speeding the average rate at which trips are made. What will be the effects of this new form of transportation on the form of the city?

a) Will the decline of the importance of the central business district be reversed?

b) Or will the city become even more dispersed? And if so, in what form?

c) How can the guideway be used to encourage the development of a particular form of the city?

d) Will the guideway make any measurable change in the style of urban living?

5. The total transportation problem comprises all the trips that all people make. For what kinds of trips is it likely that the guideway will be particularly suitable and for what kinds of trips would the guideway not be at all suited? For example: can the guideway be adapted as a distribution system in the suburbs? Or in the central business district? And similarly will the guideway suit people of some socio-economic classes better than others?

6. Given the feasibility of the guideway how should its use and development be financed? The guideway will compete, especially in the beginning, with the existing transportation system which after all, does work. Moreover parts of this existing system will work better as more traffic is diverted to the guideway.

a) What fees should be charged the user for the use of the guideway?

b) How should these fees be collected?

c) How should money be set aside (if at all) for future guideway development?

d) Should any of this be subsidized from Federal funds?

e) The infancy of the guideway is likely to be particularly perilous. How would you modify and allocate these changes in the first stages?

What is the feasibility of these suggestions?

7. All new enterprises make a low obeisance to a cost-benefit analysis--and not much more. For good reason: at best it is very difficult. But a cost-benefit analysis is worth doing even incompletely for the value of listing the component that should be taken account of. Assume that the construction costs of one channel of guideway are equivalent to that of a four lane highway. Now list as best as you can the other components of the cost benefit analysis with estimates of their costs and benefits.

8. The guideway has a comparatively small cross section and its mode of operation (electric) promises to be unobtrusive. The other noises it might generate, tire and wind, may well be made small. As an urban sculpture it has the potential of intimacy and compatibility, and by its linear extent it can also be monumental. What new possibilities and problems does it present as part of the city scape?

PLENARY SESSION BEGINS.

DR. FLEISHER: I am told that the order of proceedings now is to call in turn on the various chairmen to summarize something. What you summarize will be, I presume, the proceedings in your own committee. If you summarize nothing, do I assume that nothing happened or that the problem is simply too big to describe? I will let you decide. Let's start at random. The chairman of the combined groups three and six was Mr. Glassman.

MR. GLASSMAN: I am not going to try to summarize the entire discussion because we had much lively discussion on the items involved, mainly on question three and to a lesser extent on question six.

One of the first points raised was the point of a system of programming existing vehicles similar to a plane filing a flight plan. Why couldn't some gadget be installed in each automobile in which you register your destination and you would be given the best approach, what streets to take, similar to these radio reports they have now to avoid Route 128 during certain hours?

DR. FLEISHER: That is the way it would work once you get on the guideway. If you want to control routes, then you must have a guideway at all points. The guideways in present technology work only if they are exclusive rights of way. You can't mix children and guideways and you can't mix unguided vehicles with guided vehicles. That means if you want to do any control of the routes, it must be done with the man or the guideway itself. Where you put it is your choice.

MR. GLASSMAN: Another question raised was on the question of predictability of the guideway system. We were concerned with the paragraph which implies that there had been a limited number of trips in. Now would this be a limit on the number of people who can use it? Is this a question in which the guideway would operate on a schedule and you need to reach there at a scheduled time?

DR. FLEISHER: It says that since the destination of a trip must be declared upon entrance to the guideway, this declaration can be used to limit the number of trips to the central business district. When you enter your guideway, you register your destination. You do no more. The guideway then takes over and you are delivered to the entrance of the place you designated.

The question that I raised with respect to the central business district is that since this is such a pleasant and relatively efficient way to travel, might not the central business district be visited by many, many more vehicles than would ordinarily, and what do you do with the vehicles at the other end?

And I suggested that one way possibly of solving the problem would be that if you declared your destination to be the central business district, that there could be a sign saying, "wait until the channels are cleared." It is not a prediction. What you have done is registered that your destination is Kenmore Square. The system says, "no, we have too many people approaching Kenmore Square, more than the capacity can take, and you will have to wait a little while."

MR. GLASSMAN: You still have the alternate of taking the freeway.

FROM THE FLOOR: I would think that since we are considering the idea of approaching the guideway system in a private vehicle, that this would be well worked out with an external expression of the guideway system via radio, by a radio system which is only broadcasting this information to guide these people to the city, at which point if there is a delay in getting to Kenmore Square, they may have this option through the radio.

DR. FLEISHER: That is true. The point I made is that this is a positive control.

FROM THE FLOOR: He should know this as he is approaching or leaving his house, so the external radio will give him greater freedom and he will be happier about it. This will be a public station or an authority station.

DR. FLEISHER: That is right.

MR. GLASSMAN: Another question raised was, what is the advantage of the guideway system as compared with an automated public transportation system?

DR. FLEISHER: The guideway system is automated public transportation. When you are on the system you have given up some of your rights as an individual. You are now publicly being moved. You are being moved on a public right of way under public control. You have no alternate but to sit. In the same way in a public transportation system you have no alternate but to sit. Once on, and you have no control of where the train is going. You have control of where it stops because it is your personal vehicle; that is its great advantage, but it is a public transportation system. What this automated highway tries to do is combine the virtues of the public and the private transportation systems in one vehicle that requires no change of mode.

MR. GLASSMAN: Isn't a mass transportation system more efficient because of the fact that it moves greater numbers of people?

DR. FLEISHER: Not necessarily. The cost of a bus per seat mile is equivalent to the cost per seat mile if you were driving a Cadillac. Not many of us drive Cadillacs, not new Cadillacs anyway. So that in your own vehicle, the cost per seat mile is cheaper than the cost in a public transportation vehicle right now, provided the automatic controls might not by themselves cost too much. The automotive highway is mass transportation and it may be as cheap.

FROM THE FLOOR: When you say seat mile, do you mean five seats to a car or are you talking one and one-half people to a car?

DR. FLEISHER: In the case of an ordinary automobile, used for two people, you are operating at a slightly lower cost per seat mile than a bus.

FROM THE FLOOR: Does this take into consideration insurance costs and depreciation?

DR. FLEISHER: Yes.

FROM THE FLOOR: As part of our group's conclusions, we felt that the compatability between public transportation and the guided way was greater than that between the guided way and freeways or expressways. Ultimately, maybe this would be an integral part of the public transportation system, which we conceive of having at intervals on the public guided way, at intervals carrying larger amounts of people who might come into town on the guided vehicles to shop and come back on the private way with the packages.

DR. FLEISHER: Let me repeat: the guideway is public transportation.

FROM THE FLOOR: Would you be a little more specific about what you mean when you speak of the cost per seat mile of operating a bus? Is this jus the cost of operating the bus itself?

DR. FLEISHER: This is the cost of the bus, the depreciation, the insurance, the running costs, the driver, and what else have I left out?

FROM THE FLOOR: How about overhead, administration, and all that, of the organization that operates the bus?

DR. FLEISHER: I think it includes that too. If you add that, the cost of the seat mile per bus goes up, and the point I am trying to make is that the cost per seat mile of a bus is not cheap; it is expensive transportation as compared to the automobile.

FROM THE FLOOR: You are not talking about what the customer pays?

DR. FLEISHER: Certainly not; I am talking about the cost. The customer subsidizes the cost, and that is why we have deficits.

MR. GLASSMAN: Another question that was raised or conclusion we came to was that given a guideway system, it was the feeling in my group that operating with rented cars rather than with personal cars would be a terrific boon to the parking problem, where cars are driven in and just left for storage all day long and taken out to go home.

It was felt that by using rented cars you would get more utilization of the storage facilities.

DR. FLEISHER: There is no question about that. Sometimes you must stop to calculate that non-productivity of a parking garage. There is an investment of approximately $1,000 per vehicle and that vehicle is sitting there doing nothing except occupying space for eight hours a day. You are quite right, if you have enough people, you free a lot of money for other uses. I am not sure that these uses necessarily might be better than if they were sunk into parked cars remaining idle.

FROM THE FLOOR: You assume if these are parked cars, they would be very, very small and enough for one or two people to use them and it would ease your storage problem.

DR. FLEISHER: You would want to make them cheap also; I agree.

FROM THE FLOOR: In this cost per seat mile that we have just gone over, did you take into account that one vehicle might be driven a hundred thousand miles a year and the other one ten, or is it on a straight mile basis?

DR. FLEISHER: That comes in the depreciation costs you mentioned.

MR. GLASSMAN: That is about all the comments I have on question three, if you want to move on to one of the other questions.

MR. FLEISHER: All right, Mr. Eldredge.

MR. ELDREDGE: Yes, we had questions two and seven, and it looked like a mandate to design a system.

The most important thing is that we could use rapid transit lines more effectively. In fact, this probably should replace rapid transit and become a total expression of rapid transit or of public transportation, and that obviously this would reduce the bus cost as well.

The idea of being able to circulate these things without drivers might involve a terrible time with the union, but ultimately I think society has to win some battles. Then the only other option would be that we have a kind of rental vehicle that rides on the guideway, and we felt you probably wouldn't get on the guideway with your own vehicle. I think that the problems are technical. Just the question of coming from Chicago, from somebody else's guideway, coming here and getting on this one requires an overall comprehensive unity which might be difficult to achieve. But coming here and getting on the guideway in a rented vehicle, you quite possibly would be able to get off and go around the city in that.

We had the question of relieving congestion which really is a general thing. What relieves congestion? And we came right back into the discussion here. The assumption is that the only reason we are talking about this is that it is going to relieve congestion.

Storage was one thing, and size another, and both have been mentioned. Possibly it might be cheaper to keep these things in motion rather than pay for a place to store them; maybe they are coming right back out to the less dense areas and filling up again. But those things, once the system was accepted, were details that could be based on further information.

The question of existing rights of way, public rights of way rather than the expressways. None of us could really answer the question of how you would limit other people from driving into the city. This becomes their own transaction with congestion, I would assume, and yet we are willing to accept an awful lot. Mention was made of the express busway on the turnpike. People still get on the turnpike and drive in and get caught in traffic and they don't seem to care.

We discussed such ramifications as the effect on the gross national product of the time saved, productive time that people save not being in traffic. Then, of course, the ultimate question came up; we have over-production as one of the problems, so we are saving people time for greater productivity and are worried about over-production.

And then this brings in the question, if we are not going to have as many automobiles, what would a ten percent reduction in purchase of the automobiles do to General Motors, with one person in every four connected in some way with the problems of automobiles; gas, oil, steel and iron.

And so these are kind of scary things. No matter how effective this system might be, people are still going to be making the units that go on the transit line.

The stations and entrances, we felt, were peripheral things, roughly equivalent to Route 128 with spokes coming in, and those would be ideal for rapid transit anyway.

We did not get to the balance of guideway and conventional highway, because this really raises the question, what happens if I live in the city and want a family car? Is it going to be politically possible or desirable for me to rent space and keep the car in the city? And if I have a car in the city, why can't someone else drive to the city streets just as well, since they are public? We did some research on parking to get the sticker law in effect in Boston, which we failed to do. It provided that you be able to park on the street adjacent to your house, and this law was declared constitutional. It is the best opinion that it is constitutional, and the basis of the law goes back to the King's Highway--you can't keep your horse on the King's Highway--and that is what they cite, showing how ancient this question of the right of use of the public streets is.

Therefore, we were unable to approach the subject of what interests would make it attractive for people to use the public transportation in its new ramifications with the guideway, which led to the cost benefit analysis and things like time saved. There were all the conveniences and perhaps financial benefits, but we felt the system would have to be heavily subsidized, as, in fact, public transportation has to be. The basis of the subsidization is essentially just that, that is for the greater public good. In fact, it is one of the ways in which we regulate our culture in order to be more productive.

DR. FLEISHER: Thank you, Mr. Eldredge, especially for the comment on the King's law. I know nothing about that at all.

DR. FLEISHER: Mr. Williams.

MR. WILLIAMS: Our group was fortunate in having the teacher with us, and we were fortunate in having been able to fire questions at him and solve some of our laundry there.

Question one had quite a bit to do with the testing of such a system, so we broke it down into several kinds of necessary testing. One is the testing of mechanical and electronic equipment. That is, it appeared to be reasonable to set up test tracks and other kinds of laboratories, simulations perhaps to test the characteristics of the vehicle and the roadway systems, so that you could probably develop the hardware by performing mechanical tests.

Another kind of testing, and this was taking the term testing broadly, was to test how the system would be used by people, and this involves your commuter traffic studies, simulating a network of guideways with vehicles and tracking and certain assumptions as to origins and destinations and so forth.

The other kind of test, taking very broadly the word test, is to really sit down and spend a lot of money with architects, engineers and planners to lay out a system in rather great detail in a city. This would try to avoid the trap of the so-called typical section, the typical station, the typical intersection that one often gets into with talking about these systems. So, it would take quite a lot of money and a lot of time to take a city and do a lot of work on paper and some really careful cost analysis to see if you can fit this kind of a network into the city.

Question five dealt with what kind of trips the guideway was useful for, and we got into a discussion of the guideway network. How big would the network be and would it serve people destined for downtown? It seemed there were some reservations as to how this would work in serving downtown trips because of the great mass of vehicles coming toward downtown.

There was some debate about the through ride without a transfer. Some feeling was that you probably cannot avoid a transfer situation, perhaps in the downtown end, but if you look at the urban areas as a whole, you have a great number of trips that aren't really going downtown. They are going to sub-centers on the fringe of downtown, and going over corridors which would have high enough densities at particular points that you could probably afford this guideway equipment to handle that part of the trip.

Some of the other questions that were raised in the discussion, and I don't know if anybody in our group had solutions for them, were the automative type access to your trunk line, that is your suburban collection end. Is this really the best way of doing things? Are we neglecting certain groups of people? And are we designing too much of the city based on this automotive collection? Maybe we should be thinking about other ways of handling the suburban collection. I don't know how, and nobody else in the group had any real suggestion.

Another phase of the trip kind or trip purpose was the suitability of the guideway system for the inter-city travel. Your expressways are perfectly fine for inter-city travel today--you just get on the road and you have no stop lights from here to Chicago--but I think one of the issues that was raised was that as time goes on there will be more and more inter-city travel. Right now ninety percent of this inter-city travel is by automobile and, I think, in certainly the Northeast corridor, the right of way problems of increasing your highway capacity are such that in many cases it could be practical to have the guideway as a capacity expander for these inter-city trips.

we got around to the question of the airlines, and what they are faced with today. There is a great amount of air travel between Boston and New York, but it is not all between downtown Boston and downtown New York. This is the same as the researchers for the Northeast corridor find, that there is a lot of travel, and you take individual links of your trunk line network and you find there are large numbers of people and vehicles moving, but they aren't all necessarily going from one big center to another. Perhaps this guideway system offers a very valid alternative to some of the high-speed ground transport studies in that you perhaps don't go for such a high speed, but reduce your wait, walk, and transfer time at each end of the trip and improve convenience and reduce access time.

DR. FLEISHER: Thank you, Mr. Williams. Mr. Greenfield?

MR. GREENFIELD: Question 4.a) "Will the decline of the importance of the central business district be reversed?" And question 4.d), which I think is really part of that question, "Will the guideway make any measurable change in the style of urban living?" were dealt with.

We felt that the "decline of the importance of the central business district be reversed" is kind of a double negative, and we rephrased it and said, Will the importance of the central business district be increased?" We decided that it will only be increased if it is affected by transportation at all.

Basically, the way we thought of the guideway system affecting the form of the city, the central business district, and the style of urban living, was one in which the guideway system worked very well if it has a low density origin and destination and is a high carrier; it is a high-speed carrier of traffic in between. It works very well if there is a low density origin and destination, because then there is no storage problem, but once you have a storage problem you have almost the same kind of situation that you have today. It has to be solved either through some renting system or through some smaller automobile or through some mechanical storage system. You have a problem of whether to store the cars close to the destination point or further away.

And then you have a retrival problem. What this seemed to imply was that another subtransportation system was required. This might very well be another public transportation system which might take the form of Expo's Minirail or some other kind of small-scale arrangement which would take you from the point at which you leave the guideway system to your ultimate destination.

The question dealing with the form of the city suggested that if our basic assumption is right, that the guideway system works very well in a low-density origin and destination characteristic, then if the ultimate form of the city would be a linear one, either in a line or in a kind of a circle or taking the form of a snake in which the density would be very high in a line, then the guideway system would parallel this high density. Feeder points on and off would necessarily be low density, because it was a line as compared to say a core which we have at the present time and which there is a focus. Consequently, if the future form of the city is a linear one, then the style of the urban living may change, if our assumptions of what you mean by the style of urban living are correct. We had a little trouble determining what the style of urban living meant.

I think we assumed that the urban liver was somebody who wanted to be somewhat in the center of things and have a lot of goods and services immediately available either by walking or taxicab ride or by telephone or something of that nature, and that if indeed the new form of the city were a linear one, then it may no longer be possible to have the kind of style of living that we think of today.

DR. FLEISHER: I am delighted, Mr. Greenfield,--it shows that you have had experience with the academics when you decided to rephrase the question. Rephrasing the question is nothing more than saying, I don't like this question, and I would like to ask another different question.

As far as style of living, I am not sure what I meant about it either. I might have meant for example, that you will use the guideway not to transport large numbers of people short distances, but to transport small numbers of people long distances, so that your cities become very much more dispersed than they are now. If you have such a good or fast transportation system, you get to the places that you want to on approximately the same time schedule as you have now.

I think the term urban style of living is important. I would like to know really whether the core city is a necessary condition for the urbane life and whether you can have it in some other form, too.

I have made all sorts of remarks about the core city, most of them are uncomplimentary, and I think this needs to be done, because the emphasis is usually the other way around, I prefer the old style of city, but I don't like the inference that one hears made implicitly most of the time that this is the only way to live.

There is one other technological possibility that I didn't mention because, well, I think I didn't mention it because I forgot about it, and that may well take care of the distribution problem at the high density end. It has nothing to do with the vehicle itself, but it has something to do with routing the vehicle. It has been called various things, but essentially what you get is the vehicle on demand somewhere between a taxi and the public bus that you have now. Can you route a bus in such a way that it picks up people as the transportation is demanded? How much would it cost? How many buses do you need? Can it take care of the man who leaves his vehicle on the guideway and goes down to the street and has to go some distance before he gets to his final destination?

FROM THE FLOOR: On the style of urban living, having been a pioneer in Boston, and one of the first people who stayed when everybody was moving out and, therefore, being one of the youngest old people in my neighborhood, the major reason for staying was that at that time the automobile explosion had really hit and most people who turned around and moved back to the suburbs were not willing to go through the hell of commuting by automobile, and it was not worth it.

There were things they liked in the city, but in a sense, this decision was based as much on transportation as practically any single factor. Such things working against it were that we elected to stay and suffer the consequences of a bad school system as opposed to going out and getting a nice free ride into some luxurious suburb. So, the question of transportation, I would say, was paramount in my decision to stay. Now, how would I feel today, or what would I have done if there were something comparable to this? I think the best example would be the comfort you would have in a chair car going into Long Island.

This leads to the technical problems of this vehicle system. It is going to have to be smooth enough to allow people to read; otherwise they will go out of their minds going along looking at the scenery, and the average fellow using this thing is going to read or look at television. The other technical question is that I doubt very much if this system could withstand many breakdowns comparable to what happens when we run out of gas in the Sumner or Callahan Tunnel. Therefore, the problem of using any car on a guideway would imply that the car had stopped and that the battery had been checked, and if it were an electric vehicle, that the equipment had been quickly tested out and that the tires were kicked before we let it on, unless they have a skyhook that they can come along and lift them off when they stop.

I would say that pointed to a development of a vehicle which was designed specifically for this system, comparable with it and used for it, and there might be inter-city systems in which the family cars could be plugged into it on this high density system. I can't imagine the family car coming in. This removes the storage and the subsidy of the storage is one reason I think, rather than taking my car in and paying one and a half or two or three dollars a day, I would rather pay a dollar on this new vehicle to ride on it and back, because it is well taken care of.

DR. FLEISHER: Let me take your second point first. The system must be very reliable, that is true. It must be very, very, very reliable and this will require, as you say, some sort of inspection procedure before the vehicle is admitted to the system.

I don't think, at least I don't think right now that this precludes using the family car. It certainly does preclude using some family cars. I don't know how many. And if these numbers are large enough, that may be sufficient either to kill the system itself or to require that only public vehicles are the system. Even that is no guarantee of quality. After all, you are taking it off and running it around and not being you own, it is likely not to get the loving care it does otherwise. So, I don't see that the inspection question is eliminated simply by going to rented vehicles.

FROM THE FLOOR: Well, in just that little corner, the unit that fits on the family car could be given to you when you get there, so it is taken off a rack and just plugged in. So, it is always being tested.

DR. FLEISHER: If the only thing you are testing is that unit, yes, but it may not be so. It may be something that you are testing that you can't take off the car. I am not sure what you are testing on this vehicle. What you suggest would be nice. It is like going to a drive-in movie.

FROM THE FLOOR: Yes, and if you commute regularly using your car, you have a weekly inspection which keeps you up to date, like a commuter's ticket; otherwise, every car has to be looked at when it comes in.

DR. FLEISHER: That is possible too, if the weekly inspection does the job. I don't know anything about the schedule. I agree with you that there must be an inspection schedule.

As far as the first point that you made, it must be smooth enough for a man to read, otherwise, he goes out of his mind. All right, I think you ought to be able to read, and, in fact, the automobiles right now is not a good place to read, even if somebody else is driving, and I don't know whether you can make it smoother. I suggest another alternative to this; why not design the highway so it is a pleasure to look out? And this is another way, another problem that we might want to worry about, especially now that the driver and the occupants of the vehicle have a range of vision that is 360 degrees rather than the fifteen degrees when he drives.

FROM THE FLOOR: This is why the passenger on the chair from Long Island reads the Wall Street Journal, which he has to do anyway when he gets to the office, so he is a half hour late, but he has got caught up on everything, and that can be made an integral way of life. I suggest that is part of one of the questions, and starting your work-day early makes an awful lot of sense.

MR. GREENFIELD: I am afraid I am going to have to cut in now as we have run out of time. I want to thank Dr. Fleisher for all of us for coming here today and providing us with some very provocative thoughts about transportation systems.

(Applause)

(Whereupon, at 5:17, the meeting was adjourned.)

THE MULTI-LEVER CITY CENTER

The fourth workshop in the series on "Environmental Design" for Decision-Makers in Government convened in the Boston Architectural Center at 2:15 p.m., February 6, 1968. The subject, "The Multi-Level City Centre." The speaker: Vincent Ponte; critique: Robert Goodman. Mr. Herbert Glassman, Chairman, presiding.

MR. GLASSMAN: Welcome to our Fourth Workshop Session. It is pleasing to us in the Committee to see this turnout. I would like to take this opportunity to present my fellow Committee member, Mr. Hermann Field. Mr. Field has been a major contributor to the success of these Workshops. He is the Director of Planning for the Tufts New England Medical Center and he is also the initiator of the Urban Revitalization Plan combining urban renewal and health facilities in Boston's South Cove area. Mr. Field is an architect and planner. Mr. Hermann Field.

MR. FIELD: One of the problems that I think all of us in dealing with urban problems in one way or another are especially concerned about is the disparity between the goals of our individual sectors and the final product that turns up in the process. Most of these always seem to turn out lacking in one respect or another, usually because they are just fragmented pieces of what should be a total effort, a total bringing together of the various parties that must work together if the end product is to be a real asset in the revitalizing of our urban environment.

One of the things I associate, especially with our speaker today in the Workshop relates to this very bringing together, and as a result of it, being associated with projects that seem to have in each case come through even often better than what one had expected. They show the quality of a tremendous amount of careful groundwork, of bringing promotion and quality into the final result.

Vincent Ponte, to whom I refer, is also a Boston product. He was born in Boston, for one thing, attended Harvard College, attended the Graduate School of Design, where he got his Masters in City Planning. The main stretch of his work after that was first with Webb and Knapp and then with I. M. Pei from 1959 to 1963, where some of the creativeness of his thinking was already apparent. Subsequently he went into private consulting practice with his headquarters in Montreal.

What is especially interesting in looking at the work that Vince Ponte has been associated with is that it has been successful in not just one area but in three. And I am thinking here of the development of large-scale projects through the private channel, development of projects with public authorities and, finally, large-scale projects in the institutional field.

I think most of you have seen at least some of his large-scale projects and as for working with the private sector, of course, most outstanding is the work that Vince has done in Montreal in the Place Ville-Marie with I.N.K. and with the group that has developed the Place Bonaventure.

In connection with the public authorities, he is associated with the project for the Edmonton Civic Centre Development. He was also involved here in Boston in the Government Centre Project, as you may recall, and has been engaged in the Bunker Hill Project in Los Angeles. In the institutional sector, the projects I think of are the emerging Christian Science Development and the Kennedy Library.

He is a member of the American Institute of Planners and the Town Planning Institute of Canada.

It gives me pleasure to introduce him. Mr. Vince Ponte.

MR. PONTE: "Where there is movement, there is life" is an adage that applies as well to cities as to any other animate organism. What is it, after all, that makes a city great? What makes a city, as a physical entity, an exciting place to be in? Is it noble buildings and impressive vistas? Is it parks and trees and other restful spots of greenery? Assuredly. But none of these things can by themselves generate the excitement, the exuberance, of a great city. No. What makes cities exciting is not the physical setting alone; it is the life, the abundant, teeming life that permeates it. It is the people in the city--hurrying on their errands, working, shopping, dining, gathering at theatres, climbing museum steps, crowding into shops and stores. It is the perpetual fashion show on the sidewalks, it is the rhythum of traffic and the echoes of construction high overhead. It is humanity in movement.

I hope I don't sound as if I'm trying to update Walt Whitman or Carl Sandburg. But I see nothing trite or inappropriate in celebrating the city, when the only other sound we hear is the ceaseless litany of urban crime and racial crisis, poverty and protest, municipal disorder and fiscal grief. Even as they gird themselves for another long, hot summer, cities remain the focus of civilized living in our society, the concentrated articulation of our cosmopolitan world.

I would like to define this focus more precisely. For the qualities that lend a city its vitality, its excitement, its distinction, its special atmosphere, are pretty well confined to a single district--namely, the downtown area, the central district or, to use the jargon of planners, the core.

Look out over any North American city from a plane and you can identify at once where the core is. The way the tight cluster of tall buildings abruptly thrusts up out of the surrounding plane of low-level structures is like a diagram or graph measuring the concentration and intensity of life that springs suddenly to a peak in the core. It is the centre of the city's economic, commercial, public and cultural life. It determines more than any other district the city's special character or "flavour". Financially it is by far the most important element: the largest long-term investments are tied up there, and fully a fifth of municipal tax revenues are raised on a patch of real estate that constitutes only a tiny fraction of the total acreage of the city.

Needless to say, the condition of the core is--or should be--a paramount concern of every city for, as with the nucleus of a living cell (a fair analogy), the health of the whole city depends directly on the smooth functioning of the core. Fortunately, the core has a lot going for it. Because it is the prestige location every major enterprise of the city and of the region insists on having its headquarters there, as do branch offices of national concerns. Banks and other service institutions accordingly cluster there as well. The core is a magnet for investment and, like a serpent periodically shedding its skin, it automatically renews itself every thirty to forty years or so, tearing down outmoded buildings and replacing them with modern ones.

But for all its inherent vitality, the core is chronically subject to one peculiar disability that may be merely irritating, but can become as paralyzing and destructive as sand in the moving parts of a machine. This disability is, of course, congestion--the hampering of movement caused by sheer overcrowding.

If there is any single factor essential to the smooth functioning of the core, it is movement -- the free circulation of vehicles and pedestrians within the core and the easy access to it from outside. When mobility is hampered, the downtown district instead of being the pride and pleasure of the citizens turns into a purgatory -- all too familiar nowadays -- of choked traffic, polluted air and noise. Financially, the effects of congestion are also severe, pushing up the cost of conducting business in the city until firms in some cases are eventually forced to sacrifice prime location and leave. For every firm that leaves, there are ten others moving in and ready to live with the inconvenience for the sake of the location. Midtown Manhattan at this moment is in a frenzy of building and so are Downtown Boston and the Back Bay Districts

But every new office building adds to the congestion, raises the limit of economic cost and human tolerance and drives the traffic department to fresh expedients to keep at least a steady trickle flowing through the sclerotic arteries of the core.

The battle against downtown congestion has been going on for as long as there have been cities to congest. In ancient Rome, the situation was so bad that Julius Caesar was obliged, in one of his very first official acts as Dictator, to ban wheeled traffic from downtown Rome during business hours. So all day long wagons and delivery carts piled up in the outskirts waiting for dark; and then, according to one Roman's complaint, the racket they made rumbling and clattering over the cobblestones all night long kept Rome awake, except for the few rich in their secluded hillside villas.

Since then congestion has been fought with a variety of expedients, less desparate than Caesar's, but hardly more effective. First, traffic was made to keep to the right instead of wandering at will all over the street. Then came traffic lights, then one-way streets, and then a host of restrictive street-side parking regulations. At the same time, trolley and bus lines were organized to concentrate and channel the flow, then subways. But the congestion has only become worse, rising in quantum jumps from the spread of the family automobile to the modern freeway, which funnels tens of thousands of vehicles into the heart of the city without providing enough space for them to go to when they get there. In Boston, it has been calculated that it would take a parking lot three and one-half times the size of the city centre to accommodate the cars if everyone decided to drive. Yet the passenger load on the Boston subways shows a measurable decline in recent years. People, it seems, still want to come by car and are ready to brave the odds to do it.

Today the point of congestion has been reached at which movement in the downtown districts of our major cities has slowed to a crawl. The average speed of traffic has been clocked at less than eight miles an hour--about what it was in horse-and-buggy days fifty years ago. There are few tricks left up the sleeve of the traffic departments to speed up the flow, and the expedients already in effect are rapidly breaking down. Parking regulations are widely ignored and double parking, even triple parking, is a common sight on busy thoroughfares. Hoards of pedestrians -- including the clerical armies working in the big office buildings -- clog the intersections at rush hours, preventing traffic from making left turns or right turns, and backing it up for blocks in the outside lanes. The load of pedestrians has itself become so large that there is scarcely room for them any longer on the sidewalks.

It is hard to know who to feel sorrier for, the harrassed pedestrian, jostled on the sidewalks trying to keep his nose out of the blue fog of fumes, or the unhappy driver, locked in the glacier of stalled traffic -- or, for that matter, the many enterprises that have to carry on their business in such hostile surroundings.

Clearly the time is past for makeshift measures which are for all practical pruposes impotent to alleviate the congestion, let alone recover anything of the beauty, the dignity and the human convenience that we should expect in the central districts of our great cities.

You may be wondering why the core cannot simply and automatically correct itself and recover movement by spreading itself thinner over a bigger area. Many downtown areas to be sure are walled off topographically by rivers, harbours, canals or hills, or by man-made barriers like railroad yards. But even when there is no apparent obstacle to prevent them from spreading, city cores refuse to do so.

What must strike any student of the anatomy of American cities is that the average size of the core is between seventy and a hundred blocks, or two to three hundred acres, and this holds good for any American city whether its population is half a million or several million. The reason for this curious uniformity seems to be that this dimension encompasses the distances a businessman is willing to walk to meet his lawyer, his accountants, his clients or a housewife to do her downtown shopping. Despite all the advances in transportation and communications, businessmen still insist on meeting and dealing with each other face to face; and the core conforms.

This is a crucial objection to those who, like Patrick Geddes and Lewis Mumford, advocate dispersion, or those who more recently, like Marshall McCluhan, visualize the city of the future as a shapeless urban tissue scattered like stardust and held together by the invisible threads of telephone and TV. The fact is -- and if you don't believe it, ask any businessman -- there is no substitute for physical confrontation at the office or over lunch, daily and at a moment's notice if need be.

The downtown area automatically adjusts itself to the convenience of human legs. The core is compact and will remain compact because it wants to be -- because it has to be. There are sound economic reasons for this as well. As I mentioned a moment ago, there are enormous investments, public and private, that are already locked into downtown areas for years to come. Further investments, equally huge, are being made there at this very moment. Despite the hazards, the drawbacks and the gloomy prophecies, more money is pouring into downtown than ever before. These investments are obviously going to be protected and not thrown overboard by dissolving the core.

The clincher, of course, is that the whole character and spirit of city life depends on compactness, the coming-together of many people in one place and at one time. Dissolve the core and you destroy the excitement, and the elan of a great city. You wind up with a thin grey tissue spreading monotonously for miles, devoid of life, devoid of interest.

The question, then, is how do you keep the core compact and concentrated, but relieve the congestion; and how do you make it convenient and attractive and interesting? And the solution that planners are increasingly turning to is the so-called multi-level city -- or, to be more precise, the multi-level core.

Now there is nothing startling or mysterious about the notion of a multi-level core. Give the problem to any reasonably intelligent high-school class and they would probably come up with the same idea: if you want to break up congestion and create a pleasant downtown environment, get pedestrians out of the streets and put them on a separate level. At the same time, revamp traffic patterns, widen streets where necessary, and provide ample off-street parking, especially new truck routes, above grade and below.

Nor is this idea exactly new. Leonardo da Vinci was probably not the first person to think of it, but he has left us a sketch showing how he would provide a sixteenth-century Italian city with a separate pedestrian level above the traffic, with walkways spanning the crowded streets and arcades tunnelling through buildings. Since then, the idea has cropped up again and again, refined and elaborated to match the evolving complexity of city life. At the turn of our own century the architect Antonio Sant'Elia tackled the problem of movement in the modern downtown district and presented his suggestions in a series of visionary sketches. One in particular shows trains, trucks, cars and pedestrians all neatly separated within a giant framework of skyscrapers, tunnels and high-flying bridges.

Until lately these schemes have gotten no further than sketches on paper. The ingredients of the multi-level city have been applied only piecemeal. New York's Rockefeller Plaza is, of course, the best known example. Elsewhere, isolated underpasses have been built at critical intersections; streets have been closed here and there to create a small pedestrian mall. And even the few super-block developments with open plaza, which some of our cities have managed to carve out of their downtown districts, have turned out to be nothing more than little islands surrounded by swollen seas of traffic. The multi-level approach has never been applied on a significant scale, or with the conviction on the follow-through to show whether it really was a practical remedy for congestion without sacrificing density, whether it really could upgrade land value and land use, whether it really could restore movement, interest and vitality to the threatened core and whether, finally, it could by osmosis and extension significantly repair and improve the whole milieu of the city.

But today, for the first time in any major city, the multi-level core has actually been applied on just such a scale and with just such conviction. This is in the city of Montreal; and although the experiment there began a mere twelve years ago, it is already widely recognised as a breakthrough in dealing with the problems of the central city and as a model for the future development of downtown areas in North America. To visualize the creative release this kind of solution can bring, I would like to show you how it came about; what it is, and how it works.

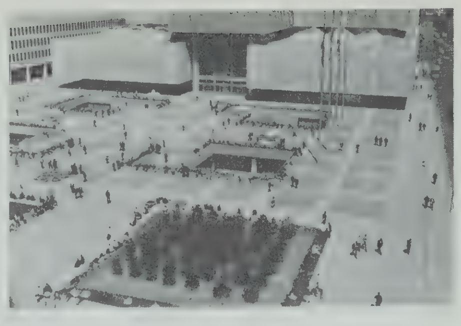
A large portion of Montreal's downtown district has been converted into a multi-level structure. To give you a general idea of it, pedestrians circulate through a large, sheltered, climate-controlled environment of their own -- a broad, airy, warmly-lighted concourse filled with places of entertainment, services and shops of every description, and with views outdoors into open courtyards let into the pedestrian plaza overhead. In summer, the glass walls roll back and restaurants and art galleries overflow into these courtyards, bringing the outdoors in.

Outdoors -- around, above and below -- traffic unhampered by pedestrians moves freely and quickly along widened streets surrounding and criss-crossing the whole structure. Special driveways, piercing the periphery at intervals, speed delivery trucks to unloading stations deep in the interior. Automobiles have their own terminals in several large multi-level parking garages which undergird the entire structure.

Supported by the multi-level core and rooted into it is the superstructure of new office buildings -- one of them 45 storeys tall -- also Montreal's major hotel, a 3,000,000 square foot international trade mart and the two central railway stations.

This represents a density of construction a hundred times greater than what was there before; yet it has been achieved without loss of movement, in fact with a dramatic improvement of it. Carefully calculated approaches from freeways and from other parts of the city make it easily reached by car and truck; and the three subway stations which are also plugged into the structure make it swiftly accessible for pedestrians coming in by rapid transit.

A person can leave his home in the suburbs, travel downtown and board a train at the station without once waiting for a traffic light or even seeing a car, and sheltered from the elements all along the way. On a good day, a hundred thousand visit Montreal's multi-level core, many of them, of course, to go to work in the office buildings or to catch trains and subways, but many more simply to shop, dine, go to the theatre -- or simply to wander around. It has become the prestige address for business; it has become the focal point for the social life of the city; it is always thronged with people day and night. With the formal and harmonious design of its superstructure, with its buildings grouped around the plaza, it has also become the true centre of Montreal. It has given the city a new centre and a new lively cosmopolitan character.



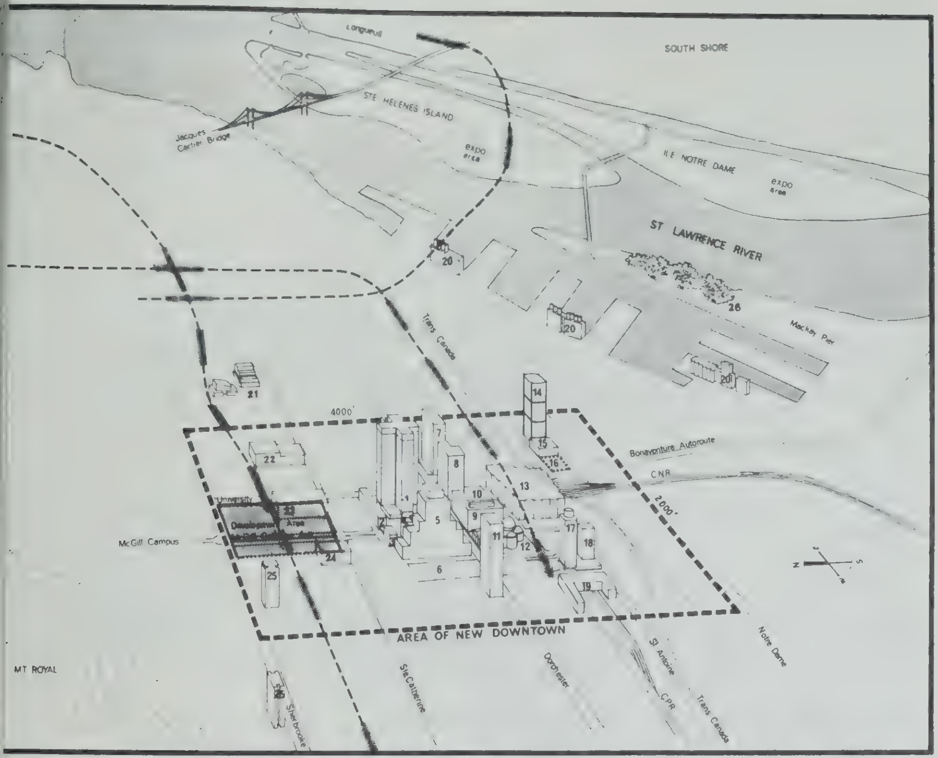
There are three reasons why this breakthrough took place in Montreal. First, there was a significantly large parcel of land that was centrally located and under single ownership -- the Canadian National Railways. Secondly, the Canadian National Railways chose to develop the land as a single integrated unit, linked functionally to the surrounding city rather than turn it over to piece-meal, helter-skelter, lot-by-lot development. Thirdly, the city government, worried over Montreal's planless growth and anxious to brighten the city's image and its quality, gave the project its steady and unstinting support. Montreal's multi-level core, in other words, came about through a conjunction of public interest and private enterprise.

The multi-level core started out small -- only 22 acres out of the 200 acres of the total core. But with its dense concentration of facilities and with its close connection with the surrounding fabric of the city, it was large enough to have a major impact. Until this time, Montreal had been absorbing about 300,000 square feet of new office space every year. The new multi-level nucleus, financed by William Zeckendorf, and known now as Place Ville-Marie, threw open all at once an additional 1.5 million square feet of office space, 70,000 square feet of retail space around the Plaza, plus 165,000 square feet of retail space in the pedestrian concourse below the Plaza, and two parking levels of 1,000 stalls each sandwiched in between the concourse and the railway tracks.

This was an enormous amount of space for the city to absorb at one time and some prophesied that Montreal would choke on it. In fact, by attracting major tenants it proved to be a magnet for further development. Even while Place Ville-Marie was

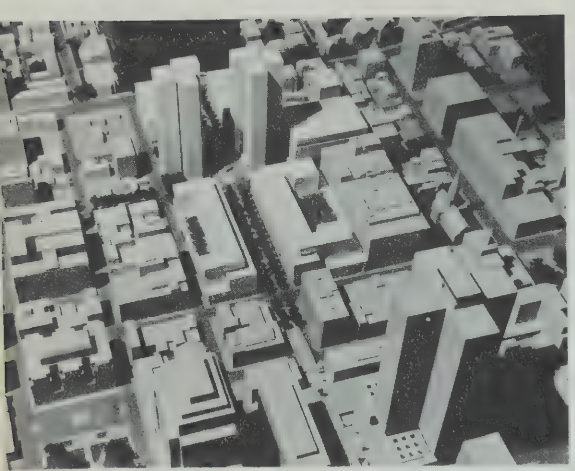
under construction, other office towers began going up around it. Two of them opened their doors in 1962 -- the same year as Place Ville-Marie itself and threw an additional 1.5 million square feet on to the rental market. This, combined with Place Ville-Marie's 1.5 million, represented as much office space as was built in the ten previous years in all of downtown Montreal. But the project had been conceived and executed so soundly that even this double load was take in stride. The new buildings along with several others constructed at this time had no trouble finding tenants.

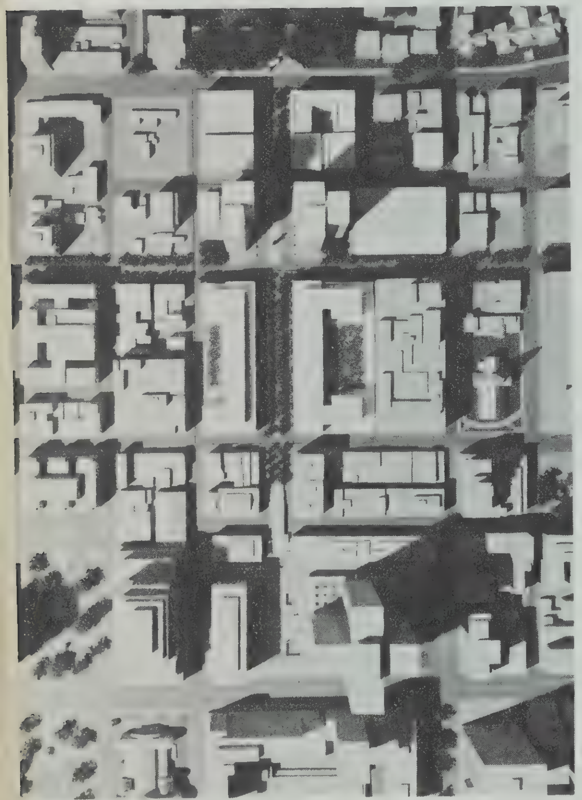
Meanwhile, from the initial hu of Place Ville-Marie, the pede trian network has been spreading rootlike into surrounding blocks. The building of the Montreal subway (1963-66), accelerated and partly finance by tax revenue from the new multi-level centre, has hastened the development of additional land lying to the north and the south. To the south, Place Bonaventure, an $85 million trade centre has just opened its doors. It covers six acres and has 3.1 million square feet of space, includin a five-acre exhibition hall, five floors of merchandising mart, and a 400-room hotel on the roof. The two lower level consist of shopping galleries, with more than 100 stores whic connect to Place Ville-Marie,

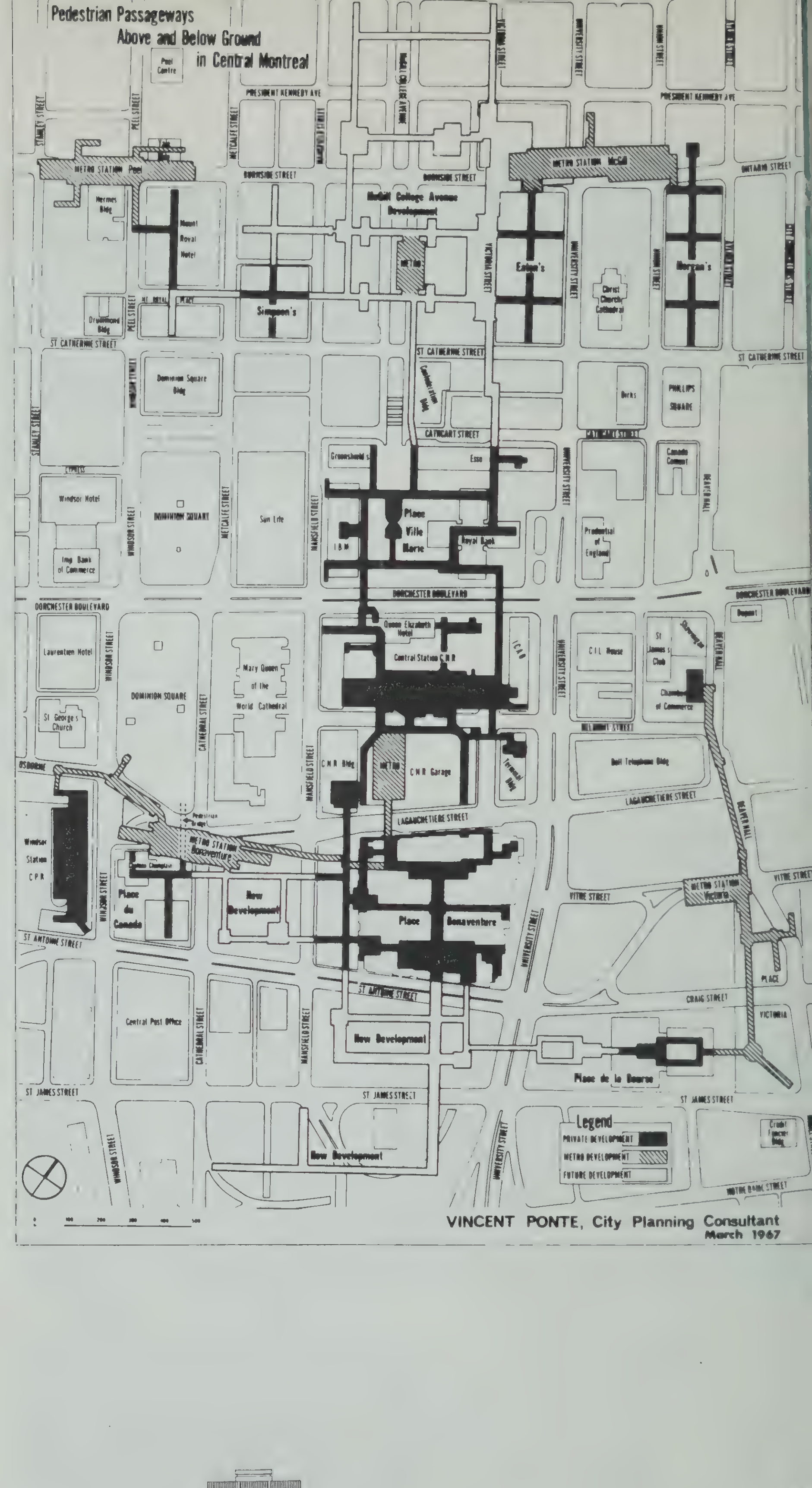


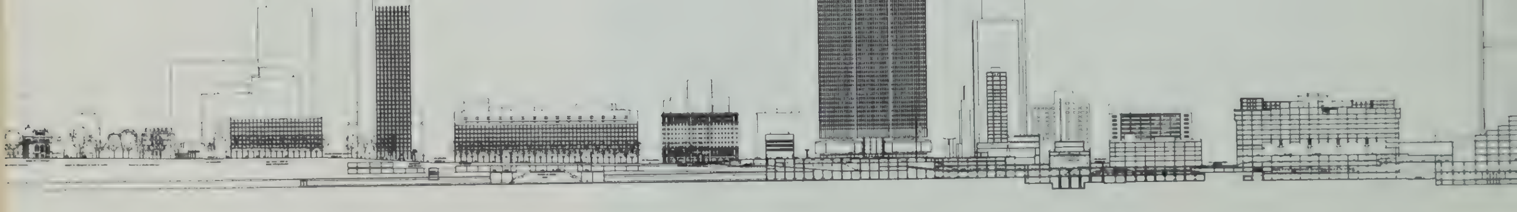
KEY TO MAJOR BUILDINGS

1. Royal Bank Building
2. Esso
3. Greenshield's
4. IBM
5. Sun Life
6. Dominion Square
7. CIL House
8. Terminal Tower
9. Queen Elizabeth Hotel
10. Central Station CNR
11. Canadian Imperial Bank of Commerce
12. Cathedral
13. Place Bonaventure
14. Place Victoria Tower
15. Stock Exchange
16. Planned Second Tower
17. Chateau Champlain Hotel
18. Place Du Canada Office Building
19. Windsor Station CPR
20. Grain Elevators
21. Place Des Arts
22. Morgan's (Dept. Store)
23. Eaton's (Dept. Store)
24. Simpson's (Dept. Store)
25. New Residential Buildings
26. Habitat









L'AVENUE McGILL COLLEGE
PLACE DU MAIL

lengthening the pedestrian network to 1,700 feet. From the trade mart, the network will be extended laterally to the Stock Exchange complex on one side and another hotel-office complex on the other.

Now that the retail activities within Place Ville-Marie have proved successful -- being fully leased at rents twice as high as anywhere in the city -- the once skeptical department stores and other enterprises which lie to the north, beyond the present margins of Place Ville-Marie, are clamoring to join in. Here also, as in the south, two subway stops have opened up what had been backdoor land to front-door type development. And plans have consequently been made to extend the system northward to include them, adding another 25 acres to the spreading multilevel core.

A corresponding redevelopment, formal and rationalized, will take place on the surface as well. The core will expand to the gates of McGill University at the foot of Mount Royal along an avenue that will be transformed into a processional sequence of new buildings -- a characteristically French way of handling space that reached its apogee in the hands of Louis XIV's master planner Le Notre.

The future of the multi-level core does not end there. Pushing outward in all directions, Montreal's downtown centre will within a few years embrace a network of shopping concourses for exclusive pedestrian use, linking 100 of downtown's 185 acres, with a total length of more than six miles. Rooted into it will be 15 million square feet of prime office space, 4 million of retail including 40 restaurants and 8 movie houses -- 3,500 hotel rooms, the Montreal Stock Exchange, the big Trade Centre, 9,000 car stalls, four subway stops and two railway stations. Woven through this 100 acres, the pedestrian level will accommodate 500,000 people at a time, all of them out of sight and sound of traffic, never having to cross a street or wait at an intersection as they pursue their errands in their climatically-controlled environment, sheltered both against the winter's cold and the summer's heat.

The traffic, meanwhile, benefiting from the absence of pedestrians, flows freely through and around the multi-level core. Place Ville-Marie has generated an enormous volume of it, but the street and parking system handles it easily. The volume of traffic is expected to rise still more in 1972 when the Trans-Canada Highway is completed. But this extra load has been planned for, with one-way distributor streets leading directly from the Trans-Canada Highway to garages located below and above ground.

Offstreet loading and trucking requirements are also well provided for and designed to interfere only minimally with movement on the streets. By 1976, there will be 130,000 square feet of truck docking space and 80,000 square feet of roadway, all neatly and unobtrusively tucked away on different circulation levels inside the multi-level core. Six truck entry points will service fifty acres of the core, whereas, if this land had been developed in the haphazard lot-by-lot process of most downtown areas, at least 70 truck entry points would have been needed to serve the same area. By designing for whole superblocks at a time, relief for surface traffic can be advanced enormously by simplifying the delivery services that clutter city streets.

Gentlemen, in urging Montreal as a model for the rescue of downtown areas, I fully realize that Montreal had important existing advantages which encouraged the development of the multi-level city. Other cities may have the funds, the civic determination and the same harmony of purpose between public and private interests. But not every city has 22 acres of fallow land, lying practically undeveloped at the beginning of a building boom and in the midst of its business district.

Even so, every city, in the course of its continuous and automatic cycle of self-renewal, finds large parcels of land, centrally located and publicly or privately owned, coming up periodically for large-scale redevelopment. In recent years, opportunities have been multiplied by national provisions for urban revewal, slow as the process may be. Too often, though, they have been thrown away or used shortsightedly by crowding the land with another dense forest or speculative buildings that merely add to the existing congestion, or else by setting up something spacious and grandiose without any vital, living link with the surrounding urban tissue and which, therefore, will remain for generations a void, a dead spot in the midst of the downtown area. No plan, however ambitious, can simply be translated into stone and steel and be expected to work unless it develops organically from the needs of the economic forces in the city surrounding it. A text-book plan imposed on a city out of context is certain to do more harm than good. Furthermore, any attempt to convert a present-day downtown area -- Boston's Washington/Summer Street District, say -- into a multi-level core at one stroke would be a staggering undertaking, involving a fantastic disruption of the existing plant, not to mention insurmountable costs and legal tangles that are better imagined than described. No, the only successful approach toward creating a multi-level core is to recognize and utilize the prevailing economic tendencies and large-scale development opportunities, in however fragmentary a form, and exploit them, harmonize them, unite them and raise them to a new level of effectiveness within the new system. That way, the graft of new urban tissue is far more likely to take, to join at all points, the parent body.

Take, for instance, your own city of Boston. Whether you realize it or not, you already have, the first elements of what might develop into a first class multi-level core -- or at least a separate pedestrian environment. One element consists of a 30-foot wide tunnel under Winter Street which would connect the Park Street Station to the basements of Filene's and Jordan's. It is a powerful axis which could be put into use almost immediately with shop fronts along its entire length. And as buildings to the north and south in the area between Temple and Bromfield are rebuilt, lateral pedestrian ways could be inserted connecting to the initial spine under Winter.

This may not seem to amount to much. The Winter Street Tunnel and its lateral extension might add up to no more than 4,000 feet of passageways -- compared with four and one-half continous miles in actual use at this moment in Montreal. But it would be a boon to the most congested section of the core. With a little imagination and initiative, the present tunnel could be turned into a light, cheerful and profitable promenade lined with shops, cafes and services.

In the Back Bay around Copley Square, a great opportunity for above-street level promenades can be easily foreseen within air rights development over the Massachusetts Turnpike lands. This system would plug into the John Hancock Center and continue in an unbroken crescent westward behind the Sheraton Plaza Hotel, over the Turnpike interchange and across Huntington Avenue up to the Public Library. Ultimately the above-level promenades could be tied into the Prudential Center, at least at plaza level.

Such promenades, whether under ground in the core, or above-grade around Copley Square, would, of course, have to be financed by the individual developers of the various blocks through which the pedestrian level passes. This would be easy enough to work out if the interstitial spaces -- the ones still waiting to be filled -- were owned by one or two developers. But they are owned by many and it is highly unlikely, if past experience in other cities is any index, that any group or individual developers would ever get together and agree on a unified, integrated pedestrian system that would really work. They simply are not in the habit of looking beyond the boundaries of their own lots.

However, if they were given the proper incentive, they might and probably would be induced to change that habit. There is a precedent for this in the zoning ordinances enacted in recent years which grant developers extra floor space beyond the normal limit, provided that they open up plazas at the front of their buildings. What they sacrifice at the bottom, they make up six or seven times over at the top. Developers have become so enamoured of this ordinance that plazas are proliferating all over our cities -- sometimes even to the detriment of the city landscape.

If a single zoning regulation can proliferate plazas, why couldn't another one also produce a pedestrian concourse in segments. Those among you who are architects design the basement floors of modern office buildings to have a maximum of eight feet between floor and ceiling -- enough head room for storage or parking of cars, but not enough for a pedestrian mall or shops, which require at least nine or ten feet between floor and ceiling. Why not enact a zoning ordinance that would grant a developer extra rentable floor space topside as a reward for providing a ten-foot space below, which could be used subsequently as a pedestrian level? The incentive to cooperate in this would be all the stronger because a shopping concourse generates direct income for the developer. An ornamental plaza does not. The effect of such a zoning ordinance would be that as each lot came up for redevelopment -- as it surely must in the automatic cycle of self-renewal downtown -- a great horizontal space would gradually come into existence, spreading through block after block, to knit together what are now merely scattered fragments of a pedestrial level into a total pedestrian environment. The cost of this would be privately defrayed. The only public expense would be to make the short connections between blocks where the concourse passed underneath the intervening streets and sidewalks.

A separate pedestrian level within the Boston core between Tremont and Washington Street or out Copley Square way is no luxury or frill. At the rate at which Downtown Boston and the Back Bay are developing and growing in density, an extensive pedestrian level becomes an absolute necessity in order to maintain that movement on which the life of the core depends. During the next twenty years, at least ten, probably twenty more skyscrapers the size of the State Street Tower will spring up in the downtown core. The additional crowds and cars they will attract can be calculated right now -- even their location. And the only way such a useful pedestrian environment can be created to accommodate these crowds in an area divided as the downtown is into a number of small, privately-owned parcels of land, is by the sort of legislation I have suggested. No city in North America has established such a zoning ordinance or even conceived of it. But there is no reason why Boston, a leader in civic design and architecture for generations, should not once again by the bellweather city to show the others the way. A zoning ordinance to create a pedestrian plenum for the first level below grade and the first floor above grade could be passed tomorrow; and its results thanks to the rapid rate at which the central city is tearing itself down and rebuilding itself, could be experienced and enjoyed in the lifetime of almost everyone sitting in this room.

Once we start moving people comfortably and conveniently through the core, there is no excuse not to do the same for trucks, electricity, telephone lines, waste disposal and other utilities, conducting them throughout the district in their own reserved space where they can be reached easily for repairs, instead of having to dig up the street every time there is a line break. At the same time, to speed deliveries and ease the flow of surface traffic, districts of five or six blocks could be provided each with its own underground truck delivery network, with only one truck entry point -- or at most two -- for the whole district, instead of forty or fifty which you find in the conventional street scene.

While the Winter Street and Copley Square zones are undergoing these changes, the multilevel system can -- and inevitably will -- spread into surrounding areas, as they also develop and grow. The existing subway lines, and the one proposed in the Southwest Expressway, will bring people directly into the office buildings and department stores.

Subway stops in the Back Bay can in turn be linked to the parking garages over the expressway or within new buildings. From there, to the west, the new pedestrian network can be extended, using moving sidewalks when convenient and necessary, into high-rise residential communities in the Prudential and Christian Science Church districts, which, according to present plans, cover some 60 acres of new development west of Copley Square. There is no reason why much or perhaps even most of this particular extension could not be above grade in the open air passing, like Leonardo's sketch which I showed you a few moments ago, through arcades and lobbies, over streets and around plazas and fountains. To the east, a high spine of office towers will gather along the flanks of the Massachusetts Turnpike with direct pedestrian connections between its parking garages.

This may sound dreamy. But it is not only technologically feasible, it is economically and politically practical -- provided that the municipal government furnishes, through imaginative and responsive legislation the legal instruments to spur private enterprise to set this development in motion. If it does, I predict that, in fifteen short years, Boston's multi-level city will be well on its way and Boston itself will once again have reconfirmed its status as the pace setter among America's cities.

MR. FIELD: Thank you, very much, Vince. I think you all can see why we brought Mr. Ponte here from Montreal. I suspect that each one of you represent a piece of synthesis that he so beautifully showed in the material he presented today. And certainly, I couldn't help but think various times of bits of our Boston problem--whether it was CBD Central Business District area or the waterfront or the Prudential area or the big question mark that for many of us the impending John Hancock Project represents. I bet they began to wonder about the multilevel aspects that were presented today and how this relates to the John Hancock project and its integration with its surrounding area.

Today, we have as a respondent to Vincent Ponte, Professor Robert Goodman of the faculty of MIT. I think many of you know Bob. He is an architect, as well as a teacher and critic. Also, I think some of you are familiar with his recent work as President of Urban Planning Aid which is intimately concerned with another aspect of our urban problem--the ghetto area. And as you know, Urban Planning Aid is trying to work out, as in some other cities, the whole question of approach to advocacy planning in the ghetto community. Bob is also architectural critic for the Boston Globe.

He is working on a book on the theory of urban design and, incidentally, he must be partly familiar with this building we are in because he was one of the prize-winning team that designed the Boston Architectural Center building. I would like to introduce Bob Goodman.

MR. GOODMAN: I don't know if I am going to live up to the expectations that Justin Gray and Mr. Field had for me. I am sorry that Dick Bolan couldn't be here today. I did speak with him about his ideas of the multi-level cities, and what I am presenting to you today is actually a combination of Dick's ideas and my own, but I don't want him to be responsible for what I present, so I will take the full burden of that.

I would like to commend Mr, Ponte for a very thorough presentation of the Montreal scheme. I agree with him that proposals of this sort are not new. The ones he has shown, the Prudential Center in Boston and others throughout the country indicate that we are moving in the direction of multi-level centers within cities. But I wouldn't agree that the Prudential Center in Boston is a typical example of what can be done on a small scale in terms of creating--I think you said--'an island of interest in a sea of boredom.' I would change that metaphor for the Prudential Center and call it 'an island of boredom in a sea of diversity.'

What we have in Montreal is a large scale demonstration of the functional capabilities of the multi-level system. As designers, we can't help but be awed by the scope and ambition of that design. Further, we can't help but be awed by the short amount of time it has taken to put that project together in relation to the time it takes to put together similar projects in this country.

But, there is a point Mr. Ponte made that I would emphatically disagree with--namely that the multi-level city center is a cure for what ails modern cities. It may be a cure for a limited part of city problems--for some of the bigger downtown business enterprises, for real estate developers and some of the people who use downtown. But I don't think we can avoid admitting that we haven't been able to answer the more basic problems of our cities. Projects such as this are a very small part of the city and tend to heighten the disparity between what is perceived as a shining downtown and a set of deteriorating slums which surround it.

Another point I would take issue with is the idea that the core area, as Mr. Ponte had described it, automatically adapts itself to basic and simple requirements of the people who use it. It should be obvious, if this were true that we wouldn't really have very many problems downtown and that the multi-level design approach wouldn't be needed. The multi-level approach is actually a highly complex and sophisticated one, applied by the will of man on problems that he has a difficult time dealing with on a single level.

I also question the analysis which concludes that overbuilding in the core area has naturally lead to shopping centers in the suburbs. I think there is quite a different reason for this--you might look at it this way. You could say that overbuilding in the core was a product of a very limited kind of accessibility that existed in our cities. This accessibility was provided before the thirties by rail systems and as soon as we began to use the automobile, we provided individuals with a much greater range of choice. In effect, the single center with radial lines from the core area is no longer the type of city form that we have to deal with. The multi-level center is not so much a response to growing building congestion as it is a very highly sophisticated suburban shopping center brought downtown. In the downtown areas that developed traditionally, there was a certain degree of continuity and flexibility built in that allowed a great number of individual decisions to be made.

We should think of projects such as Montreal in that context; we should recognize that we are involved in a compromise situation; that we are trading between a kind of flexibility and more individualized development for decisions for a dramatic improvement in the functional operation of certain elements downtown. By no means are we solving all of the problems of how development decisions should get made in a downtown area.

One of the real difficulties of a project like this, that should concern us, is what happens to the existing areas of the city adjacent to it? How do the existing areas adapt themselves to the multi-level changes? If the entire core area becomes a multi-level center with all of its existing buildings torn down, we don't have to worry about that problem. But, for one thing, we know this may not be desirable; for another, it is not likely to happen that way.

So, we have to involve ourselves with what the process of change should be and how our present core area can adapt itself to this process.

Beyond looking at the city-wide development forces which have affected downtown centers, one must recognize that the concentration of so much development in one place, as in the case of Montreal, is in itself a strong force in determining the financial success of the project. At present, about forty per cent of the people who shop downtown are already there, most of them employees in downtown enterprises. So if you go ahead and build a shopping center downtown with a great deal of office space and hotel area on top of it, you have, in fact, built in a captive audience for your shopping center below. This presents itself as a very compelling idea to a would-be developer.

People involved in multi-level projects in this country should understand the set of circumstances by which the Montreal project came about and should then measure the information in relation to the possibility of adapting the Montreal experience to the situation in American cities. Mr. Ponte noted there was a large amount of area in the Montreal case that was centrally located and under single ownership or control. He also noted these areas were contiguous with each other. There were also relatively few agencies, units of Government and individuals to deal with. Now compare this with the process that exists in the United States, especially the urban renewal process where land must usually be assembled by acquisition from many small property owners, and where we have many levels of Government-Federal, State, and local, plus a number of private developers who are usually involved in such projects.

The other fortuitous circumstance we should understand about the Montreal situation was how market forces were operating in relation to the development. It was pointed out to us that there was very little development in the years between 1929 and 1960. It was a situation with a pent-up economic demand for office space in the core area. It was also a case where new office development was already moving in the direction of the area that was redeveloped.

We have only to look at some of the projects in the Boston area to recognize the amount of time that it would take us to go through a project like this, if these sets of circumstances were not the same here. A good example might be the Government Center which started about ten years ago--that project is still far from completed. We also have to look at the number of designers that are typically involved in such large-scale projects in this country. We have designers operating in various levels of Government sector and in the private sector, with different and often overlapping and conflicting design decisions being made in each of these sectors for a single design project. In the Montreal case, you have designers working simply with the private developer on a relatively large tract of land and a great deal of financial commitment to actually going ahead with the project when the design was finished.

A final point I should make was the difference between the two major projects within the Montreal multi-level center, the Place Ville-Marie and the Place Bonaventure. In architectural terms, there is an almost day-to-night difference in the approach to the building design. Let me briefly outline these differences.

You probably noticed in the presentation that some of the new development involved a broad plaza and a single tall building. This seems to be a pattern that is repeated, not only in the Montreal case but in many downtown areas in this country as well. In fact, in New York City, they provide a bonus in the zoning code for allowing a certain amount of land on the ground as a plaza, with the building rising in a continuous shaft-like form. This is a very formal idea that has its roots back in the Renaissance and one that doesn't really explain the complexity of activities that should be visually apparent in multi-level centers.

But in Place Bonaventure which is a much more aggressive building, looking like a hundred buildings put into one, the complexity becomes apparent in the building's form. There are many different things going on in that building, and from almost any vantage point from the street or inside the project, you get different physical qualities to respond to the kinds of activities that happen in that building.

There is a great deal to be learned from Place Bonaventure. I would hope, myself, that the lesson of that particular approach, is that at the architectural scale of city design, we approach our problems in a way that more clearly reflects an open-ended solution to the problem and deals with the functional complexity of buildings in very real formal terms.

In discussing complexity, some note should be taken of the number and complexity of the pedestrian levels that were shown as they related to stores and highways and truck terminals. Many of you know of the kinds of image studies that have been done by Kevin Lynch and others dealing with how people learn their environments. It is relatively easy, when you have a single plaza and a building, to say that it is a point of orientation. But when we get into a highly complex system with tunnels, with open spaces, connections between underground spaces and spaces in plazas above-ground, the system tends to become a highly complicated pattern and one which is very difficult to learn.

This is one of the drawbacks in projects like this, expecially since there isn't a strong "imageable" pattern to begin with. If we begin with a number of different parts of a project that somehow get connected at some point after the project gets started, we have to have some kind of mechanism for doing this in a way that will create an understandable system for the person who uses it.

MR. GREENFIELD: Thank you very much, Bob. (Applause)

At this point participants break up into smaller workshop sessions to discuss one or more of the following questions:

1. In North American cities, land areas which comprise the central business district vary in size from a few hundred acres to 1000. But the area of densest concentration of buildings and people seems to be limited to about 200-300 acres. This would indicate that there are sound economic forces at work which result in compact business cores. To what degree should we as professionals foster such concentration? Are we not adding to the mounting problems of congestion? Should the theories of dispersal into subcenters be more actively pursued with social, civic, and psychological effects? Can we expect the result from either or a combination of these planning policies?

2. If it is true that the land area of our central cores confines itself to 70-100 blocks, on which each generation tacks more and more floor space adding measurably to street and sidewalk congestion, have not our zoning laws been defeated? Have not the combination of real estate realities, rising land costs, business requirements for face-to-face confrontation, expressway construction focusing on the center, and other centrifugal forces negated floor area ratio controls? Are floor area ratio controls valid anymore, and, if not, can new circulation and building rules be devised to make a virtue of this irresistible momentum of growth in the core?

3. Separating pedestrians and vehicles is an old idea. Over the centuries this has been tried out from time to time. More recently, it has become fashionable for every city plan to include pedestrian malls, underground walkways, pedestrian bridges and plazas, spanning streets from one super block to another. Boston proposes just such an ambitious combination for its downtown retail-office center. So have St. Paul, Seattle, Philadelphia, Houston, San Francisco, and Toronto. In fact, bits and pieces of such separations have already been built--Rockefeller Center was the earliest example in this century. If the idea is valid as a release from congestion, why are we unable to graft the multi-level principle onto larger areas of downtown centers? Are the obstacles that block the path legal, financial, physical, social, or simply a paucity of imagination? Is the kind of system that Boston proposes for itself primarily the responsibility of the public sector; how can private enterprise be made to participate more readily.

4. Boston, like many other cities, is in the throes of the pedestrian-vehicular separation kick in the belief that this will bring relief to traffic, safety for people, and the continuing vitality of the downtown center as a place of intense business and civic life.

Along with simple,direct design criteria of circulation and land use, what do we need to apply so as to make sure that the proposed scheme will be used willingly by people? Consider that Penn Center, Philadelphia is regarded by many professionals and businessmen as a flop, even though it incorporates clearly the separation of pedestrian and vehicular circulation throughout several continuous blocks. There seems to be some rules which lead to success, others to less success. What, precisely, are these rules which involve real estate, land use, site design,topography and transportation, and how should they best be fitted together?

PLENARY SESSION BEGINS.

MR. GOODMAN: I have been asked to lead the discussion group and although you have had only a very short period of time to discuss the questions, I am hoping you will at least raise the issues to a level at which we can begin to discuss them. We have four questions from four Workshops. I would like to ask if Mr. Eisenberg would report on his Workshop.

MR. EISENBERG: On Question No. 1, there were four parts and the first part was whether or not the professionals should foster the concentration in the central city. The group decided that the professionals in this case should refer to the team of professionals, the developer, the financial people, the planners, the architects. In actuality, if you separated out only the architects and planners as the professionals, their function would not be so much to foster the concentration as to present the graphic consequences of what might happen.

It was agreed the assumption that there is a sound economic base to the fostering of concentration in the central district is a valid assumption, but that also there is a social force driving this kind of concentration. People like face-to-face confrontation; until such time as we get the television-telephone where people can talk to each other and see each other at the same time, face-to-face confrontation is an essential part of the concentration in the central district.

In Question No. 2--Doesn't this add to the mounting congestion in the central district? The attitute of the group was that you can't keep people out of the central district and, in fact, it is a desirable thing to get them in. The question of mounting congestion is really a design problem which can be handled as it mounts.

There were suggestions made such as the mini-bus for local kinds of transportation. It was recommended that Mr. Ponte consider a moving sidewalk in his underground transportation network. Perhaps these problems can be handled by new means such as the guide rail system of transportation discussed at the last Workshop. In general it was felt that mounting congestion will come as a natural result of this concentration, and that the concentration was probably desirable.

In discussion of the desirability of dispersal and the social, civic and psychological results, it was pretty much agreed that it probably is good to disperse the functions that are not necessary for either face-to-face confrontation or that enhance the economic and social activities that normally occur in the central district--such things as storage problems and warehouses. These are the kinds of things that even now we see moving out of the central district.

In general, the discussion also centered on the stadium--whether it should be in the center of the district as a viable, social function or on the outskirts. Most of the group agreed that it should be in the center; that it is a desirable function. And it was brought up by one of the members who wishes to be unnamed since there was no one in the group from Los Angeles, that this is a dispersed community and is, in general, unsatisfactory in its aesthetic and social effect.

We assume that question 4 meant can you predict the results; not can we expect the results, but can we predict the results that might happen from dispersal vs. the concentration, or a combination thereof. In general, it was felt that the dispersal within or around the city would create sub-activity centers. You would be back to creating kinds of congestion centers anyhow. For instance, if you disperse theaters around the city, outside this seventy to one hundred blocks, let's say, activity centers would spring up around them. Theaters would bring restaurants and they would bring stores, etc. You would be back to concentration problems again.

It was felt that the main prediction on the concentration would be a vehicular congestion, which goes back again to the problem we discussed in Question 2, that this is a design problem. By rules and regulations of handling traffic, in design of the facilities - whether or not they be multi-level cities - this can be handled. The prediction was that the social and economic forces, the efficient use of plant facilities etc., tend to make the group feel that we will continue to have a concentration in the center city.

MR. GOODMAN: You are sure all that happened in half an hour? (laughter)

I would like to discuss the argument of whether we ought to concentrate new development in the center or disperse it to the periphery. As in many cases, it is really not an either/or question.

In fact, if we look at some of the cities around our country, we find there are a number of alternatives that seem to be taking place. We tend always to think in terms of the poles which may be, at one extreme concentrated development such as New York City and Los Angeles at the other end, which is the typical example we like to give of the dispersed pattern city. But we do have some other things happening in our cities which are worth looking at.

In many metropolitan areas we can find multiple center cities. A good example is the case of St. Louis, where there has been a tremendous decrease in population in the center of the city, and a build-up in the downtown area in a much more specialized development than existed before. At the same time, there has also been the development of what might be called new cores around that city. These are serving the same face-to-face contacts that we normally talk about when we champion the benefits of downtown.

So, it isn't an either/or question. In a discussion for what the form of the cities should be, we ought to be thinking about much broader alternatives and the mixes that can occur between these alternatives. We ought to also be thinking about the political implications of such actions. One of the things that is happening in cities like St. Louis is that the downtown area, and especially the area around the core, is tending to become Black with its downtown remaining White. The outside areas are tending to develop their cores with their white population surrounding them. Whether the patterns of development are dispersed or concentrated will, no doubt, have a tremendous effect on the race problem. This, however, is something that planners are not going to be able to address by themselves--like it or not.

Why don't we go into the second Workshop, and that is Mr. Pires.

MR. PIRES: On the question related to zoning and density which entered the discussion on multi-service complex in relation to zoning, some felt that the freedom of the individual or pedestrian traffic is probably sacrificed in order to create functional direction for cars and trucks and mass transportation systems. The question of how far we get away from the sun and how important it is arose; how much of an effect does artificial climate control, which is necessary to these complexes, have on our lives, since we spend the best part of our day there.

We also entered into a discussion of the creation of zoning laws and how vested interests enter into the conception of zoning required by laws or amendments to them. Even though professional planners could see these zoning laws as basically for the best public good, there are other interests that always seem to steer the best public work in other directions. Other individuals felt there was a need for a complete rethinking of zoning laws, especially on multi-purpose complexes where residential and commercial uses may need to be joined to promote a successful business venture and to produce a better tax base.

One of the problems is that perhaps traditional zoning laws are limited, and that bonuses or incentive measures to zoning like an increase of density by allowing the builder or the promoter to increase a set-back or by allowing the investor to add more parking to a particular project are needed. The municipality also participates in this particular venture, and collectively they could resolve some of the complications that result in new developments.

It also was agreed that it is very difficult to amend existing zoning by-laws. The interesting point was brought up that the English are now reverting to what is called development control rather than zoning. A set of plans is submitted to an appointed body, or supposedly an appointed body who can approve a plan if, purportedly, it is suited to the area. We entered into a discussion on this. It is new thinking, rather than including a zoning law, to have this development control placed in the hands of a body or people within the municipality.

MR. GOODMAN: Thank you. When we talk about zoning laws and the vested interests that create them, I am reminded of how zoning got started in this country back in the 1900's, which certainly addresses itself to the problem of vested interests. As some of you may know, the first time we had zoning in this country was after the State of California tried to use immigration laws to keep the Chinese out of California. When it was decided that this was unconstitutional, the city of San Francisco instituted land use zoning which zoned out Chinese laundries and put three hundred Chinese out of business overnight.

Then there was the "wonderful" case of our first building height zoning. In New York in the early 1900's, the Fifth Avenue Association instituted, with the help of Mr. Edward Bassett, a height control on buildings on lower Fifth Avenue because they were concerned about the kind of people that these establishments were employing, mostly low-income people. They thought they were ruining the character of Fifth Avenue, so they instituted a low building height control. You may think we have come a long way since then, but we always have to keep in mind that very often present proposals for zoning reflect very limited interests, including the exclusion of Black people from some areas of our cities.

I would like to call on Mr. Jack Simms.

MR. SIMMS: As usual, under my deft leadership, we wandered all over the garden on Question No. 3; however, there were two points made that I think I can report on. There seems to be no question in anybody's mind that the difficulties in extending the multi-level concept into larger areas are numerous. The most obvious roadblock, of course, is the large number of landowners that might be involved in this sort of process, and the unwillingness of people to participate in a planning project during its initial stages and their reaction to a plan only when implementation is imminent.

MR. GOODMAN: Now I would like to call on Mr. Paul Carroll.

MR. CARROLL: We were concerned with Question No. 4, and it seemed that we were to be the humanists in here to try to discover what we need to apply to make sure the proposed scheme will be used willingly by the people. At the outset of our discussion, we took up Professor Goodman's pedestrian problem, people finding their way around within an effective system, the necessity of concern with the scale of the system as it is enlarged. This, apparently, remains a problem. We are fortunate in having Mr. Ponte with us who says it is also a problem between the planners and the traffic people, so we may have this problem at the present time. We also mentioned that this particular system in Montreal had a particular advantage because of the slope of the land, the pedestrian enters at street level. It was felt in many cases there has been a great deal of reluctance to move down. The system apparently is working; the people are using it, which is reflected in the high costs of the retail shopping.

Another problem of coordinating for the desirable effect of the people moving throughout the system, is the problem of the private developers, of coordinating each developer with the other; again with the Canadian Pacific as the major coordinator in the sense that your system is part private and part public, we have a dual problem here.

It was suggested, also, that other elements such as housing might be highly desirable to bring more people into this system, to give it variety and to maintain a balance between night-time and daytime activity. This seemed not too possible within the Montreal development at the present time because of the high land costs. This system is new. Since it is new, there doesn't seem to be any vandalism because the people have a certain pride relating to it. Again, the coordination of the public interest and the private interest in the developers is involved in the question of whether it is desirable to provide larger spaces and more identity within the system, and how one goes about accomplishing this.

One important thing to me is the coordination of the multilevel services between the transportation systems, the highway systems and the problem of continuity of personalities. Designers and other people within this seem to be part of the success of this particular system--this continuity and the driving force of the mayor on other business interests, which seem to be all moving on the same track with the private interests who developed something which was desirable and acceptable and useful for the public interest.

MR. SIMMS: I would like to know if in the design of the Montreal project there was actual consideration given to questioning the people who would use this multi-level operation as to what they really wanted, or whether you designed the project in terms of what was best for the people, hoping thereby to educate them as to what they would want.

MR. PONTE: What actually happened was the professionals were part of the team along with the developer. It was their professional experience with shopping centers and downtown areas that produced the plan and the development. They had in mind what people will do and what they want.

These are the things the professionals distill through experience, not by polling the untutored.

No, there were no questionnaires in Montreal. By the way, we made mistakes, a number of them. Even so, the input and mutual experience of the developer, the architect, the planner, the traffic engineer, the construction engineer produced a very fruitful result.

I would like to make a comment, if I may, on the first question about moving sidewalks. Moving sidewalks are effective only when you have to overcome a built-in mistake. For instance, you will find them in poorly designed airports when passengers have to walk long dull distances to get from point A to point B. You don't need to put a moving sidewalk into a mall or a concourse lined with shops, whether downtown or in a suburban center. A moving sidewalk is a restriction on shopping. It prohibits moving back and forth across the mall for comparison shopping. In fact, you'd never get it installed or accepted by the developer because shopkeepers would never rent stores along a promenade or mall that has a moving sidewalk in the middle.

From the Floor: In Montreal, which is on a slope, in the nature of things you are going to get many levels and in the design of the center they quite naturally take advantage of the slope. You may have things one over the other, whether or not they are underground; on the other hand, in Manhattan, which I suppose is the most dense piece of urban property in the world, it is amazing how little two-level use there is. And then, perhaps, the only second level is when you change function from shopping, an ordinary business activity on the street level, to transportation down below. And if New York can stand paying that much on a single level, it is hard to see where a multilevel center is the course of the future.

MR. PONTE: New York seems to be slowly, inevitably grinding to a halt. Every city gets into trouble at some point, but strangely enough, when things seem just at the point of coming to a standstill, the professionals find the means and the politicians find the money for breaking through the glacier.

New York is in trouble in appearance as well as congestion. Look at what has happened to the scale and shape of buildings just in the last twenty-five years on Park Avenue and Sixth Avenue. Today's tower buildings are totally different in shape, size and location on the site from the previous wave of ziggurat buildings. Both came about through restrictive or incentive zoning.

But, tower or ziggurat, all these new buildings built on a lot-by-lot basis only add to congestion without proper circulation systems. Whereas the underground circulation system in the 42nd Street area does work to relieve congestion by separating people from vehicles.

The Pan American is an enormous building. You may not like it architecturally, but it functions well on its site by distributing thousands of people quickly to the offices without crossing streets. The Railroad and subways all meet underground and they syphon people directly by escalator and elevator into the building. Everyone in New York said that the Pan Am was going to congest the 42nd Street area beyond hope. In fact, there has been very little congestion added in spite of the fact that it draws fifteen to twenty thousand more people into that zone. Moreover, you can go from 42nd to 46th Street underground without having to cross a street. It isn't a very pleasant walk, but it works. When New York puts in the new cross-town subway, it plans to plug the mezzanine levels of the subway into buildings constructed on either side. But these are not continuous systems, linked one to another. Until they are, New York City's circulation troubles can only mount.

I would like to comment on Question No. 2. There was a psychological point brought up about artificial climate control and people living or working in such an environment. Do you realize of all people who work downtown, ninety percent of them never see daylight during working hours? The few people who see light during the day are the executives in the outside offices only. Workers in a department store don't see daylight either. However, I would not attempt to justify undercover levels by saying that ninety percent of the people do not see daylight in their present working conditions.

What I like to think is, that, at mid-day when it is raining or when it is freezing cold, thousands of people can move about without having to put on raincoats or galoshes from office or bull pen to shopping areas and restaurants and back to office refreshed and dry. It seems to me that this kind of convenience and comfort is preferable to dumping them out on the street, forcing them to find their way through traffic and smog, in all kinds of weather.

By the way, Montreal is not an underground city; it is an undercover city; parts of the new circulation levels for people only are above grade as well as below.

On traditional zoning - we are restricted and limited needlessly, I believe, because basically zoning is still negative. It has been to date. Apply restrictions across the board over large areas and say - this is the way it must be done and every new building conforms. Out of rigid conformity comes uniformity and mediocrity; every building may become a ziggurat, as in New York City during the early post-war years. Every so often, we get on a new kick. Recently it has been plazas. About five or six years ago new zoning ordinances were written to proliferate plazas. The developer given a bonus of several square feet for every square foot he provides down at the base of the building is, of course, delighted.

But what does this foolish zoning do to the city? On Park Avenue, it is destroying the street facade. The hope of getting open space on the ground, applied by rote, across the board, destroys the city street. What would be more sensible, and what I think is about to happen, is sub-development planning where each major development will be considered on its own merits. Here in Boston or elsewhere it should assure flexibility and better design results.

In certain parts of the city we should give bonuses to developers not to build plazas, and in other areas, give bonuses to produce a plaza only where we want it. I think zoning should be that flexible. I believe that zoning made flexible in a democratic society of responsible people will be handled properly by talented professionals and developers.

From the Floor: On the question of zoning, would it be disastrous if we abandoned zoning altogether and left cities to grow strictly on the economic test, whether the thing would succeed or not in the use that the developer wanted to put it? For instance, the City of Houston has a lot of things going against it, but it has planned to become a very dynamic development without any zoning ordinance at all.

MR. PONTE: Today I sort of straddle that position and the one that says there should be some control. I think there should be some control. If I had to make a final decision tomorrow, I'd say control, yes. Houston has no zoning - but Houston doesn't have very much to save relative to the past and heaven knows what it wants the future to be. Under the impact of economic pressure, you would always get towers within a certain central zone. And you can be sure, left alone, towers would rise to any height. There is nothing wrong in this if we have some sort of control relative to the circulation of people, loading of trucks and parking. This is where there should be a strong degree of regulation. The question is, can we make it so flexible that competent administrators will really produce the end result by means of the economic forces--i.e., new levels of circulation to absorb the increase of people because of larger buildings.

MR. GOODMAN: I would like to comment on this problem of zoning control which does seem to be a difficult one. I think the approach that was used in New York many years ago, this ziggurat zoning that we all know about, in effect, was a more logical one from a public interest point of view than what we are using now. To take an idea which seems to be a fad now - that is, the plaza building he referred to, and to restrict development to that particular type of building is wrong; whereas the other one addressed itself very directly to the problem of sunlight and air on the street. I think, for myself, we ought to get back to that kind of performance zoning rather than to develop elaborate formulas about height in relation to length of building and giving bonuses for plaza development.

The other question that we seem to have gotten into here, perhaps not directly, is the question of exactly what you want to zone. I think it is essentially a public system that you are dealing with. It should have some control over that, but at this level of development, you are talking mainly about shopping facilities and also transportation facilities, so there should be some network of development plan at that level. So that, in a sense, you can plan performance and zoning guaranteeing light and air in places where there are going to be concentrations of people but at the same time a development plan at a lower level that guarantees for the public the kind of open spaces, pedestrian plazas, skating rinks, whatever you want to call it, that guarantees development for the public, so that in fact, you could have much fewer controls but geared to much more specific needs.

I think in the one case in Montreal, one of the problems that we seem to be facing in all of this multi-level development,(and I don't think anyone has really found a direct answer for it)is what happens on the periphery. Everything seems to work internal to the buildings along some central spine. Mr. Ponte talks about what happens to the street facade in terms of Park Avenue. I certainly agree in terms of the space of the street; it destroys it by having the plaza. At the same time we have to consider the activities that normally go on along the street and when we begin to put up concrete walls or whatever, we destroy the traditional life on the street and we destroy the continuity that existed before between traffic - be it cars and pedestrians - and the building itself.

MR. GREENFIELD: I am very sorry to have to break off the discussion at this point, but I am afraid we have run out of time. I think I speak for all of us here, Vince and Bob,when I thank you for providing us with a great deal to think about. (Applause)

(Whereupon, at 5:10 p.m. the meeting was adjourned.)

AN ECOLOGICAL BASIS FOR PLANNING *

The fifth workshop in the series "Environmental Design for Decision-Makers in Government" convened in the Boston Architectural Center, March 5, 1968, at 2:30 p.m. Subject, "An Ecological Basis for Planning." Speaker, Ian McHarg. Critique, Richard S. Bolan. Mr. David Wallace, Chairman, presiding.

MR. GREENFIELD: I want to welcome you all to our fifth workshop session. I would like to call on my fellow committeeman, Mr. Dave Wallace, who will moderate today's session and introduce the speakers.

MR. WALLACE: Professor Ian McHarg is a Scotsman who received his professional education here at Harvard where he received a Masters in Landscape Architecture and a Masters in City Planning. He is currently Chairman of the Department of Landscape Architecture and Regional Planning at the University of Pennsylvania.

Professor McHarg has been a principal investigator for the Urban Renewal Administration on the Pennsylvania-Metropolitan Open Space Project. He also is a partner in the firm of Wallace, McHarg, Roberts and Todd in Philadelphia.

Some of the projects that he has been involved in with that firm include the Green Spring and Worthington Valley, part of Baltimore County; the Inner Harbor Study in Baltimore; the Lower Manhattan Plan; the Comprehensive Landscape Plan for Washington, D.C. and a I-95 study for the Highway from Delaware to Raritan River.

In many of these projects Professor McHarg has been concentrating on an understanding of the ecological forces acting in the landscape, analyzing these and synthesizing them with the human functions in developing these plans.

Some of his findings have been published in magazines; among these: "Man and Environment" in The Urban Environment; "The Place of Nature in the City of Man" in the Annals of the Academy of Political and Social Science, March 1964; "Ecological Determinism" in The Future Environments of North America; and "Ecology of the City" in The Architect and the City.

It is with pleasure that I introduce Professor McHarg as today's speaker. (Applause)

McHARG: It is my proposition that, to all practical purposes, western man remains obdurately pre-Copernican, believing that he bestrides the earth round which the sun, the galaxy and the very cosmos revolve. This is a great delusion indeed, and the time has come to dispel it, for it has fueled our ignorance in time past, is directly responsible for the prodigal destruction of nature and for the encapsulating burrows that are the dysgenic city.

We must see nature and man as evolutionary processes which respond to laws, which exhibit direction and which are subject to the final test of survival. We must learn that nature includes an intrinsic value system in which the currency is energy, the inventory is matter and its cycles, the oceans and the hydrologic cycle, life-forms and their roles, the cooperative mechanisms which life has developed, and not least, their genetic potential. The measure of success in the processes, in terms of the biosphere, is the accumulation of negentropy in physical systems and ecosystems, the evolution of apperception or consciousness and the extension of symbioses, all of which might well be described as creation.

This can be pictured simply in a comparison between the early earth and the present planet. In the intervening billions of years the earth has been transformed and the major change has been in the increase of order. Think of the turbulence and violence of the early earth, racked by earthquakes and vulcanism, as it evolved to equilibrium; think of the unrestrained movements of water, the dust storms of unstabilized soils, the extreme alternations of climate unmodified by a green meliorative vegetative cover.

In this early world physical processes operated towards repose, but in the shallow bays there emerged life and a new kind of ordering was initiated.

The atmosphere which could sustain life was not the least of the creations of life. Life elaborated in the seas and then colonized the earth, thus increasing the opportunities for life and for evolution. Plant and decomposers created the soils, anchored the surface of the earth, checked the movements of soil particles, modified water processes, meliorated the climate and ordered the distribution of nutrients. Species evolved to occupy and create more and more habitats, more niches, each increase requiring new cooperative relationships between organism's new roles, all of which were beneficial in sum. In the earth's history can be seen the orderings which it accomplishes, the increase to life forms, habitats and roles, symbiotic relationships, and the dynamic equilibrium in the system; the total an increase in order. This is creation.

This view of nature as a creative, interacting process in which man is involved with all other life forms is the ecological view. It is, I submit, the best approximation of the world that has been presented to us and the indispensable view for determining the role of man in the biosphere. It is also indispensable for investigating, not only the adaptations which man accomplishes, but for the forms in these. The place, the plants, animals and man, and the orderings which they have accomplished over time are revealed in form. To understand this it is necessary to invoke all physical, biological and cultural evolution.

The material presented here for McHarg is not a direct transcription of his talk, but rather an edited version of his paper "Values, Process and Form," which formed the basis of this workshop presentation.

Form and process are indivisible aspects of a single phenomenon which is being. Norbert Weiner described the world as consisting of "To Whom It May Concern" messages, but these are clothed in form. Process is revealed in form, form contains meaning, fitness is the criterion of the process and will be revealed in form. The artifact, tool, room, street, building, town or city, garden or region can be examined in terms of process, manifest in form, which may be unfit, fit or most fitting. The last of these when made by man is art.

The role of man is to understand nature, which is also to say man, and to intervene to enhance its creative processes. He is the prospective steward of the biosphere. The fruits of the anthropocentric view are in the improvement of the social environment, and great indeed are their value, but an encomium on social evolution is not my competence, and I will leave this subject after simply observing that, while Madison, Jefferson, Hamilton, and Washington might well take pride in many of our institutions, it is likely that they would recoil in horror from the face of the land of the free.

An indictment of the physical environment is too easy, the post-industrial city is such a squalid testimony to the bondage of toil, to the insensitivity of man, that the most casual examination of history reveals the modern city as a travesty of its antecedents, a denial of its role as the proudest testimony to peoples and their culture.

The city is no longer the inevitable residence for the polite, civilized and urbane, all of which say "city." They have fled to the illusion of the suburb, escaping the iridescent shills, the neon vulgarity of the merchants, usurious slumlords, the cynical polluters (household names for great corporations not yet housebroken), crime, violence, and corruption. So the city is the home of the poor who are chained to it, repository of the commuter's automobile, the dirty industry. Give us your poor and oppressed, and we will give them Harlem and the Lower East side, Bedford-Stuyvesant, the South Side of Chicago, and the North of Philadelphia, or, if you are very lucky, Levittown.

Look at one of these through the Cornell Medical School study of Midtown Manhattan, where twenty percent of a sample population were found to be indistinguishable from the patients in mental institutions and where a further sixty percent were found to have evidence of mental disease. See the environment of physical, mental, and social pathology.

What of the metropolitan areas or of the countryside? Well, you may drive from the city and search for the rural landscape, but to do so you will follow the paths of those who preceded you, and many of them stayed to build. But those who did so first are now deeply embedded into the fabric of the city. So as you go, you will transect the annular rings of the thwarted and disillusioned who are encapsulated in the city as nature endlessly eludes pursuit.

You can tell when you have reached the edge of the rural scene, for there are many emblems -- the cadavers of old trees piled in untidy heaps at the edge of the razed deserts with the magnificent machines for land despoliation, forests felled, marshes filled, farms obliterated, streams culverted and the sweet especial rural scene transformed into the ticky-tacky vulgarity of the merchant's creed and expression.

What of the continent? Well, Lake Eric is on the verge of becoming septic, New York suffers from water shortages as the Hudson flows foully past; the Delaware is threatened by salt water intrusion; smog, forest fires and mud slides have become a way of life for Los Angeles. In San Francisco the Bay is being filled, and men build upon unconsolidated sediments, the most perilous foundations in this earthquake prone area. DDT is in arctic ice and ocean deeps, radioactive wastes rest on the continental Shelf, the Mississippi is engorged with five cubic miles of topsoil each year, the primeval forests are all but gone, flood and drought became increasingly common, the deep rich prairie soils are thinner now, and we might as well recognize that itinerant investment farming is just another extractive industry.

It can come as no surprise to us that the most scabrous slum is more highly valued than the most beautiful landscape, that the most loathesome roadside stand is more highly valued than the richest farmland, that this society should more highly prize tomato stakes than the primeval redwoods whense they came.

This is the face of the western inheritance -- Judaism, Christianity, Humanism, and the Materialism which is better named Economic Determinism. The countryside, the last great cornucopia of the world's bounty, ravaged and the city of man, God's junkyard, or call it Bedlam, the best demonstration of man's inhumanity to man, where existence is possible in spite of the physical environment, sustained by modern medicine and social legislation.

Yet we have a great inheritance of enormous beauty, wealth, and variety. It is aching for glorious cities of civilized and urbane men. Land and resources are abundant. We could build a thousand new cities in the most wonderful locations--on mountains and plains, on rocky ocean promontories, on desert and delta, by rivers and lakes, on islands and plateaus. It is within our compass to select the widest range of the most desirable lands and promulgate policies and regulations to insure the realization of these cities, responding to the nature of their sites. We can manage the land to ensure its health, productivity and beauty.

But to resolve is not enough; it is also necessary that society at large understand nature as process, having values, limiting factors, opportunities and constraints; that creation and destruction are real; that there are criteria by which we can discern the direction and tests of evolution; and, finally, that there are formal implications revealed in the environment which affect the nature and form of human adaptations.

It is in part understandable why our economic value system is so completely blind to the realities of the biophysical world, why it excludes from consideration not only the most important human aspirations, but those processes which are indispensable for survival. The origins of society and exchange began in an early world where man was a trifling inconsequence in the face of an overwhelming nature. He knew little of its operation. He bartered his surpluses of food and hides, cattle, sheep and goats and valued scarcities, gold, silver, myrrh and frankincense. But the indispensable processes for survival and evolution were beyond his ken; they could not and did not enter his value system. Nor have they yet. But in the intervening millenia the valuations attributed to commodities have increased in range and precision, and the understanding of the operation of this limited sphere has increased dramatically. Yet, to all intents and purposes, it is the same partial evaluation which views the world as commodity and fails to understand and incorporate physical and biological processes. We are still unable to identify and evaluate the processes which are indispensable for survival.

When you give money to a broker to invest, you do so with the understanding that this man understands a process well enough to make the investment a productive one. Who are the men with whom you entrust the responsibility with ensuring a productive return on the world's investment? Surely those who understand physical and biological processes understand that these are creative.

The man who sees the sun as the source of life, the hydrologic cycle as its greatest work, is a different man from he who values sunlight in terms of a recreation industry, a portion of agricultural income, or that man who can obscure sky and sunlight with air pollution or who carelessly befouls water. The man who knows that the great recycling of matter, the return stroke in the world's cycles, is performed by the decomposer bacteria, views soils and water differently from the man who values a few bacteria in antiobiotics, or he who is so unknowing of bacteria that he can blithely sterilize soils or make streams septic. That man who has no sense of the infinitude of time which it has taken for the elaboration of life and the symbiotic arrangement which have evolved can carelessly extirpate creatures. That man who knows nothing of the value of the genetic pool, the greatest resource which we bring to the future, is not likely to fear radiation hazard or to value life.

From the ecological view one can conclude that by living, one is united physically to the origins of life. If life originated from matter, then by living one is united with the primeval hydrogen. The earth has been the one home for all of its evolving processes and inhabitants since the beginning of time; from hydrogen to man, it is only the bathing sunlight which changes. The planet contains our origins, our history, our milieu; it is our home. It is in this sense that ecology, derived from oikos, is the science of the home.

Can we review physical, biological evolution to discern the character of these processes, their direction, the laws which obtain, the criteria for survival and success? If this can be done, there will also be revealed an intrinsic value system and the basis for form. This is the essential ingredient of an adequate view of the world, a value system which corresponds to the creative processes of the world, and both a diagnostic and constrictive view of human adaptations and their form.

In this briefest of glances, it may be productive to divide the examination of this single phenomenon into four aspects. These are evolution towards order, life, complexity, and symbiosis.

First, I will take order. The evolution of the world reveals movement from more or less random, less to more structured, from simplicity to diversity, from few to many life forms, in a word towards greater negentropy.

This can be seen in the evolution of the elements, the compounds and of life. It is accomplished by physical processes as in the early earth, when matter liquefied and coalesced, forming the concentric cores of the plant. Vulcanism revealed the turbulence of early adaptations towards equilibrium. So, too, did the creation of the oceans. Evaporation and precipitation initiated the processes of erosion and sedimentation in which matter was physically sorted and ordered. When from the aluminosilicate clays in the shallow bays there emerged that novel organization, life, there developed a new agency for accomplishing ordering. The chloroplast of the plant was enabled to transmute sunlight into a higher ordering, sustaining all life.

The atmosphere, originally hostile to life, was adapted by life to sustain and protect it, another form of ordering. The emergence of the decomposers, bacteria and fungi, permitted the wastes of life forms and their substance after death to be recycled and utilized by the living, the return stroke in the cycle of matter in the biosphere.

The increasing number of organisms in the oceans and on land represent negentrophy in their beings and the ordering which they accomplish. We can now see the earth as a process on which the falling sunlight is destined for entropy, but is arrested and entrapped by physical processes and creatures, and reconstituted into higher and higher levels of order as evolution proceeds.

Evolution is then a creative process in which all physical processes and life forms participate. Creation involves the raising of matter and energy from lower to higher levels of order. Retrogression and destruction consist of the reduction from higher levels of order, to entropy.

Life. As life can only be transmitted by life, then the spore, seed, egg, and the sperm contain a record of the entire history of life. The sperm records the unity of the plant and the animal, the heme of blood and of chlorophyll are chemically related, but we assumed the parasitic way of the animals. The journey was shared with the worms, the coelenterates, the sponges, and later with the cartilage and the bony fishes. The gills remain in the fetus child. It was one with the amphibian, and from these our ancestor left the ocean for permanent life on land. But the fetus has not left the water. The reptilian line is ours.

Tree shrew, lemur, tarsier anthropoid -- this is our lineage. We are the line of man, the raised ape, the enlarged brain, toolmaker, he of speech and symbols, conscious of the world and himself. It is all written on the sperm and the egg, although the brain knows little of the journey. We have been through these stages in time past, and the imprint of the journey is upon us. We can look at the world and see our kin, for we are united, by living, with all life, from the same origins.

Life has proceeded from simple to complex, although the simplest forms have not been superseded, only augmented. It has proceeded from uniform to diverse, from few to many species. Life has revealed evolution as a progression from greater to lesser entropy.

Complexity. In the beginning was the atom of hydrogen with one electron. Matter evolved in the cosmic cauldrons, adding electron after electron and terminating in the heaviest and most ephermeral of elements. Simple elements conjoined as compounds reaching the most complex of these as amino acids, which is to say, life. Life reached unicellular form and proceeded through tissue and organ to complex organisms.

There were few species in the beginning, and now they are myriad; there were few roles, and now they are legion. There were once large populations of few species; now there is a biosphere consisting of multitudes of communities composed of innumerable interacting species.

Evolution has revealed a progression from simple to complex, from uniform to diverse, from unicellular to multicelled, from few to many species, from few to many ecosystems, and the relations between these processes have also evolved towards increased complexity.

Symbiosis. The single cell is very complex indeed; what orchestrates the cytoplasm and nucleus, nucleolus, mitachondria, chromosomes, centrosomes, Golgi elements plastids, chromoplasts, leucoplasts, and not least, chloroplasts? The lichen show an early symbiosis at the level of the organism as the alga and the fungus unite. The plant and the decomposer enter into symbiosis to utilize energy and matter, to employ the first and recycle the latter. The animal enters the cycle consuming the plant, to be consumed by the decomposer and thence by the plant.

Each creature must adapt to the others in that concession of autonomy towards the end of survival that is symbiosis. So parasite and host, predator and prey, and those creatures of mutual benefit develop symbioses to ensure survival. The world works through cooperative mechanisms in which the autonomy of the individual, be it cell, organ, organism, species, or community, is qualified towards the survival and evolution of higher levels of order culminating in the biosphere.

Now these symbiotic relationships are beneficial to the sum of organisms, although clearly many of these are detrimental to individuals and species. While the prey are not pleased with the predator or the host far from enamoured of the parasite or the pathogen, these are regulators of populations, on one hand, and agents of death, that essential return phase in the cycle of matter, which fuels new life and evolution. Only in this sense can the predator, parasite and pathogen be seen as important symbiotic agents, essential to the creative processes of life and evolution.

If evolution has proceeded from simple to complex, this was accomplished through symbiosis. This same mechanism was necessary for the evolution from uniform to diverse.

As the number of species increased, so then did the number of roles and the symbiotic arrangements between species. If stability increases as evolution proceeds, then this is the proof on increased symbiosis. If conservation of energy is essential to the diminution of entropy, then symbioses are essential to accomplish this. Perhaps it is symbiosis, or better altruism, that is the arrow of evolution.

This view of the world, creation and evolution, reveals that the principal actors are the sun, elements, and compounds, the hydrologic cycle, the plant, the decomposers, and the animals. Further, if the measure of creation is negentropy, then it is the smallest marine plants which perform the bulk of the world's work, produce the oxygen of the atmosphere, the basis of the great food chains.

On land it is the smallest herbs. Among the animals the same is true; it is the smallest of marine animals and the terrestrial herbivores which accomplish the greatest effort of raising the substance of plants to higher orders. Man has little creative role in this realm, although his destructive potential is considerable.

However, energy can as well be considered as information. The light which heats the body can inform the perceptive creature. When energy is so considered, then the apperception of information as meaning, and response to it, is also seen as ordering, as anti-entropic. Noise, to the unperceptive organism, becomes information from which is derived meaning through perception. In an appraisal of the world's work of apperception, it is seen that the simpler organisms which create the maximum negentropy are low on the scale of apperception and that this increases as one rises on the evolutionary scale. Man, who had no perceptible role as a creator of negentropy, becomes prominent as a perceptive and conscious being. Through his apperception, man is enabled to accomplish adaptations which are the symbiosis of man-nature. This is the promise of his apperception and consciousness.

This examination of evolution has revealed direction, that the earth and its denizens are involved in a creative process of which negentropy is the measure. It shows that creation does have attributes which include evolution towards complexity, diversity, stability (steady-state), increase in the number of species, and increase in symbiosis.

Survival is the first test, creation is the next, and this may be accomplished by the arresting of energy, by apperception, or by symbiosis. This reveals an intrinsic value system with a currency -- energy, an inventory which includes matter and its cycles, life forms, their roles, and cooperative mechanisms.

Form. All of the processes which have been discussed reveal form; indeed, form and process are indivisible aspects of a single pnenomenon. That which can be seen reveals process. Much of this need not be superficially visible; it may lie beneath the skin, below the level of vision, or only in invisible paths which bespeak the interactions of organisms. Yet the place, the plants, animals, men, and their works are revealed in form.

All of the criteria used to measure evolutionary success apply to form. Simplicity and uniformity reveal a primitive stage, while complexity and diversity are evidence of higher evolutionary forms, few interactions rather than the multitude of advanced systems.

Yet, there is need for a synoptic term which can include the presence or absence of these attributes in form. For this, we can use fitness both in the sense that Henderson employs it, and also in Darwinian terms. Thus, the environment is fit, and can be made more fitting; the organism adapts to fit the environment.

Form can reveal past processes and help to explain present realities. Mountains show their age and compostion in their form; rivers demonstrate their age and reflect the physiography of their passage; the distribution and characteristics of soils respond to historical geology, climate and hydrology in their physical properties and location. The pattern and distribution of plants respond to environmental variables represented in the foregoing considerations, while animals respond to these and to the nature of the plant communities. Man is as responsive, but he is selective; yet the pattern and distribution of man is likely to be comprehensible in these self-same terms.

The term fitness has a higher utility than art for the simple reason that it encompasses all things, inert and living, nonhuman, and those made by man, while art is limited to the last. Moreover, it offers a longer view and more evidence. Nature has been in the business of form since the beginning, and man is only one of the products.

That fact that things and creatures exist is proof of their evolutionary fitness to this time, although among them there will be those which are more or less fit. There will be those which are unfit and persist. Those are the misfits; then, those which are fit; and finally, the most fitting, all revealed in form.

Form is also meaningful form. Through it, process and roles are revealed, but this is limited by the capacity of the observer to perceive.

Arctic differs from rain forest, tundra from ocean, forest from desert, plateau from delta; each is itself because. The platypus is different from seawood, diatom from whale, monkey from man . . . because.

Negro differs from Oriental, Eskimo from Caucasoid, Mongoloid from Australoid . . . because; and all of those are manifest in form.

When process is understood, then differentiation and form become comprehensible. Processes are dynamic, and so coastlines advance and recede as do ice sheets; lakes are in process of filling, while others form; mountains succumb to erosion and others rise. The lake becomes marsh, the estuary a delta; the prairie becomes desert, the scrub forest; a volcano creates an island, while continents sink.

If evolutionary success is revealed by the existence of creatures, then their fitness will be revealed in form, visible in organs, in organisms, and in communities of these. If this is so, then natural communities of plants and animals represent the most fitting adaption to available environments possible to existing life forms. They are most fitting and will reveal this in form. Indeed, in the absence of man, these would be the inevitable expression. Thus, there is not only an appropriate ecosystem for any environment, and successional stages towards it, but such communities will reveal their fitness in their expression.

This is a conclusion of enormous magnitude to those who are concerned with the land and its aspect, that there is a natural association of creatures for every environment. This could be called "the intrinsic identiy of the given form". If this is so, then there will be organisms, and communities of special fitness, and these will, of course, be revealed in form. This might well be described as the ideal. The creation of adaptations which seek to be metaphysical symbols is in essence the concern with representing the ideal.

Adaptation of the environment is accomplished by all physical processes and by all life. Yet, certain of these transformations are more visible than others, and some are analagous to those accomplished by man. The chambered nautilus, the bee, and the coral are all engaged in the business of taking inert material to creative adaptive environments. These reveal the individual, a society, and a population.

Can the criteria of fitness be applied then to the artifact? We can accept that the stilt's legs, the flamingo's beak, and the mouth of the baleen whale are all splended adaptations and visible so. It is no great leap to see the tennis serve, the left hook, and the jumping catch, as the same realm as the impala's bound, the diving comorant, or the leopard's lunge. Why then should be distinguish between the athletic gesture and the artifacts which are employed with them, the golf club, the bat, glove, or tennis raquet? The instrument is only an extention of the limb. If this is so, then we can equally decide if the hammer and saw are fit, the knife, fork and spoon. We can conclude that the tail-powered jet is more fit for the air than the clawing propellers.

If we can examine tools, then we can as well examine the environments for activities, the dining room for dinner, the bedroom for sleeping or for loving, the house, street, village, town, or city. Are they unfit, misfit, fit, or more fitting?

It appears that any natural environment will have an appropriate expression of physical processes, revealed in physiography, hydrology, soils, plants and animals. There should then be an appropriate morphology for man--site, and this should vary with environments. There will then be a fitting for man-environment. One would expect that as the plants and animals vary profoundly from environment to environment, this should also apply to man. One would then expect to find distinct morphologies for man-nature in each of the major physiographic regions. The house, village, town, and city should vary from desert to delta, from mountain to plain. One would expect to find certain generic unity within these regions, but marked differentiation between them.

If fitness if a synoptic measure of evolutionary success, what criteria can we use to measure this? We have seen that it must meet the simplicity-complexity, uniformity-diversity, instability-stability, independence-interdependence tests. Yet, in the view of Dr. Ruth Patrick, as demonstrated by her study of aquatic systems, these may all be subsumed under two terms; ill-health and health. The movement towards simplicity, uniformity, and instability, and a low number of species, characterizes disease. The opposites are evidence of health. We can conclude that that which sustains health represents a fitness between man and the environment. We would expect that this fitness would be revealed in form.

This criterion might well be the most revealing to examine the city of man--wherein does pathology reside? What are its corollaries in the physical and social environment? What characterized the environment of health? What are its institutions? What is its form? Know this, and we may be able to diagnose and prescribe with an assurance which is absent today.

What conclusions can one reach from this investigation? The first is that the greatest failure of western society, in particular the post-industrial period, is the despoliation of the natural world and the inhibition to life which is represented in modern cities. It is apparent that this is the inevitable consequence of the values that have been our inheritance. It is clear, to the speaker if to no one else, that these values have little correspondence to reality and perpetrate an enormous delusion as to the world, its work, the importance of the roles that are performed, and, not least, the potential role of man. In this delusion the economic model is conspicuously inadequate, excluding as it does the most important human aspirations, and the realities of the biophysical world.

The remedy requires that the understanding of this world, which now reposes in the natural sciences, be absorbed into the conscious value system of society, that we learn of the evolutionary past and the roles played by physical processes and life forms. We must learn of the criteria of creation and destruction, and the attributes of both. We need to formulate an encompassing value system which corresponds to reality and uses the absolute values of energy, matter, life forms, cycles, roles and symbioses. We can observe that there seem to be three creative roles, and symbioses. We can observe that there seem to be three creative roles; the first of these is the arresting of energy in the form of negentropy, which offers little opportunity to man; apperception and the ordering which can be accomplished through consciousness and understanding; and, finally, the creation of symbiotic arrangement, for which man is superbly endowed.

It can be seen that form is only a particular mode for examining process and the adaptations to the environment accomplished by these. It can be tested against the criteria used to determine processes as primitive or advanced, to ascertain if these are evolving or retrogressing. Fitness appears to have a great utility for measuring form, unfit, fit, or most fitting. When one considers the adaptations accomplished by man, these are seen to be amenable to this same criterion, but also synoptically measurable in terms of health. Identify the environment of pathology; this is unfit and will reveal this in form. Where is the environment of health, physical, mental, and social? This, too, should reveal its fitness in form.

How can this knowledge be used to affect the quality of the environment? The first requirement is an ecological inventory in which physical processes and life forms are identified and located within ecosystems, consisting of discrete, but interacting natural processes. These data should then be interpreted as a value system with intrinsic values, offering both opportunites and constraints to human use and implications for management and the forms of human adaptations. The city should be subject to the same inventory, and its physical, biological, and cultural processes should be measured in terms of fitness and unfitness, health and pathology. This should become the basis for the morphology of man-nature and man-city.

We must abandon the self-mutilation which has been our way, reject the title of planetary disease which is so richly deserved, and abandon the value system of our inheritance which has so grossly misled us. We must see nature as a process within which man exists, splendidly equipped to become the manager of the biosphere; and, give form to the symbiosis which is his greatest role, man the world's steward.

(Applause)

CHAIRMAN WALLACE: Today's respondent is Professor Richard Bolan, who lives locally, educated at Yale and M.I.T. He has a Masters in City Planning from M.I.T and he is currently an assistant professor at Boston College in the School of Social Work and also a research associate at Boston College Institute of Human Sciences, as well as at the Joint Center for Urban Studies and Director of Planning at the Boston Regional Planning Project. It is with pleasure that I introduce Dick Bolan.

MR. BOLAN: Thank you. I somewhat have the feeling that Moses might have had, if someone asked him to go up the mountain and be a critic. Can we have an amendment to that one about adultery. One of the problems that I have is that what Professor McHarg presented in the last two minutes is going to generally form the thrust of my comment, because these were explained in much more elaborate terms in the papers themselves,* and in fact, Professor McHarg's very excellent analysis of biophysical processes and their relation to planning have had specific application, as the introduction suggested, in analyzing the Delaware River basin and Potomac River basin and a highway problem and so one can get into issues as to this particular kind of methodology. I am going to be somewhat forced into that, because I have frankly a good deal of respect for the intensive research interpretation not only of the biophysical processes bit, but also the Darwinian evolutionary theory which has underlain much of Professor McHarg's talk today and much of the philosophy of his approach to planning.

I have to, however, to some degree try to reinstate some concept of the intrinsic value of man's brain. There has been indeed a time honored philosophical argument concerning relationships of teleology, purpose of man and his freedom, his will in relation to various kinds of deterministic philosophy, whether it has been natural science determinism or some other notion of determinism, and I think that, as I say, it is a time honored argument, and we could go on endlessly, as Professor McHarg suggested, beating a dead horse. I won't get too far into it, but I think, in a sense, some of my comments are going to relate to this. They are going to relate to the social, political institutions of man, the way he is organized over and above the character of organization one might expect in the field of biophysical processes, and I think there are forms of organizational orderliness.

The other thing which Professor McHarg didn't get into too much in his talk, but which runs repeatedly through his two papers, is the notion that one can derive from a study of biophysical processes a value system, and while in the second paper, in which he more in detail describes the planning process which derives from this discussion, he makes quite clear he is not presenting a plan but some inferences or implications for the use of the environment.

I really have to raise a question as to whether one can derive a value system from a set of facts and propositions. This is again a kind of philosophical argument. Herbert Simon at Pittsburgh, who is more or less the classical theorist and Mr. Behavior in organization theory, suggests that indeed ethical or normative propositions cannot be inferred from facts directly. The philosophy is called the epistemological jump, much as one runs into in trying to prove the existence of God.

One question might be put this way. Given two regions of identical physical character enjoying, in effect, the same biophysical history, would one expect identical social, political and economic phenomena among the men with the brains, however imperfect, who occupy these two regions? It seems to me that there is implicit in what Professor McHarg says a chain of causality which is open to question. I am not going to answer the question; I am going to open it for your discussion later on.

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* Papers by McHarg presented as background material for his workshop: "Values, Process and Form"; "Case Study: The Potamac River Basin."

We can turn it around and look at the other side of the coin. If we had two nations say of identical social and political character, would we tend to find identical biophysical environmental histories? And again I don't know the answer to this, and as I say these are questions. Because, as I have said earlier, the institutions and organizations man devises have a tendency to go beyond the environment and, in fact, where you find similar environments, you will find quite dissimilar social and economic entities.

I think it was a French scientist, Montesquieu, who suggested that the torrid and frigid zones provide physical environments which severely constrain man's capacity and his behavior; whereas, the temperate zones tend to provide the opportunity for diversity and choice, and man can exercise greater free will.

So, this, in effect, suggests perhaps some kind of compromise in which there are extremes of physical, biophysical situations which are such that they do constrain considerably man's behavior, but there are also in the temperate zones, an opportunity for man to utilize the brain.

Professor McHarg also gets into planning applications which he didn't discuss too much in his talk, but which I would like to again raise questions for you to discuss later on. He, as a result of a great deal of analysis, suggests that there are uses of land, uses of the environment, which are intrinsic in their biophysical history, ideological history, chronological conditions, and so on; and that these in a sense, point the way as to how land ought to be used. The problem is that he then, with the analogy to the symbiosis process, asserts that these mechanisms for cooperation suggest that symbiosis is important in determining this, and any notion that is singular of monism in use is inappropriate. In fact, a number of compatible land uses exist together, and the real technical issue that evolves from this is what constitutes the criteria for compatible land uses? How does one determine compatibility in this case?

Similarly, if one finds that the typical biophysical history of a given territory would intrinsically support two quite incompatible land uses, how does one choose between them? The analysis I was provided to read was an extensive analysis of the Potomac River basin, and I found that indeed there had been a value system imposed here, at least as I read it, that did not necessarily come from the data itself, but more from the observance of the data in which there is a tendency towards emphasizing agricultural or agriculturally or recreationally related use of land. The perspective of urban development in this valley tended to be looked upon with some degree of scepticism, primarily because the criteria for determining which land should be urban were rather rigid and severe. In fact, we have had cities built upon hills and upon fairly rough land and they have been reasonably successful as cities. There seemed to be a systematic bias against the urban use of the land and a very strong bias toward agricultural and recreational uses.

The final comment that I would make and again raise quite a question pertains to this issue of social pathology, described as the destructive misfit. This suggests that there is some intrinsic deficiencies in the human forms which either suffer the slings and arrows of social pathology or who are involved in commiting social pathology, which gives rise to a question among us human organisms with and without brains, as the case may be: are there some kind of superior or more fit species of us, or is this pathology really a problem which is not akin necessarily to the species itself, but to the kind of environment that the species has created for itself? The issue of the role of the environment here becomes very predominant.

So, with these kinds of questions, and I'm sure Professor McHarg would welcome a chance of rebuttal, or at least a chance to say that he hadn't any quarrel or any feelings of discomfort about my comments, I would still have to get to the central question: how does this really influence social policy? How does it really affect our ability to plan urban communities, whether we view them as systems or organisms or whatever view we might take of them?

I think the problems of relating the very laudable and expert analysis of the environment in which we live to the normative and ethical problems which face urban communities today is still the major challenge and is still going to be a very difficult problem for us.

CHAIRMAN WALLACE: Thank you very much, Dick. The two questions that I have are: given two areas that are biophysiologically identical, would similar social, economic and cultural patterns necessarily develop? In two similar areas, some distance apart, would the same human patterns be developing there? Secondly, again if the biophysical history of an environment indicates that it would support more than one use successfully, how is the choice made between the uses? How does one make the planning decision on that basis?

I will have to call on Dick. You might disagree with these statements or the questions.

MR. BOLAN: No, no. The third question would be in the symbiotic process; in the process of determining multiple uses of territory, of land, what are the criteria for compatibility? Professor McHarg, in his paper, describes a matrix in which all of the variables which he has described in the latter part of his talk were set up on a chart and he had four levels of compatability and incompatability and the two intermediate levels, but these were not well described. So, what kinds of criteria for compatability of human land uses are important here?

Then there was a question as to the destructive misfit as applied to human pathology. Clearly in terms of biology, pathology in plant life or animal life, one can concede the argument, but when applied to human pathology, does this occur? Is there a relative degree of superiority or ability to survive among different human species?

The final question would be, what is the exact contribution of research of a study of this kind to the formation of public policy, to the development or to the answer to the ethical and normative issues that we are currently faced with?

At this point, participants break up into smaller workshop sessions for discussion.

PLENARY SESSION BEGINS.

MR. BOLAN: I have been given the difficult task of moderating this session, and I am going to rely on the workshop chairmen to make this task a lot easier.

The question I think deals with the equivalence or the dialogue, if one wants to call it that, between a system of values which is a cultural modus, if you will, as opposed to purely the ecology modus. That refers back to your comments, Dick, and I think that our view would be that this is of equivalent importance; it is in the nature of a dialogue between these two sets of systems.

There is a very simple, rather basic question, we think, regarding the time scale of this kind of approach we have been talking about. Professor McHarg has been giving us essentially a twenty-five million year review, which we say is right. It sounds right: it feels right. The question of how you get this down into a manageable time scale to do something about it, and, therefore, what importance this assumes in relation to other more cultural aspects of what we are trying to do, the operation of the brain, etcetera, in specifics is the second question.

In the third question, a subheading of the second, there is a potential conflict between what we might call automatic determination of a region versus self-determination and to what extent there is value or weight to those two opposing poles.

In the twenty-five million year view, fallability fades into relative insignificance, but under short-term view, fallability may well be the most important problem we have. That again may refer to the scale problem that I mentioned first.

And the last is really a resounding vote of confidence, I think, relative to the concept of measuring health as opposed to measuring the superficial environment. This, I think, refers to any judgements we tend to make about neighborhoods, and I think perhaps in measuring health we have some good ways of doing it. We circumvent the cultural bias of certain kinds of people measuring other kinds of people's housing and things of this kind.

MR. BOLAN: I think that I am not sure of your formal format here, but what I will do is call on each of the chairmen and then give Professor McHarg an opportunity to comment on the whole group of comments rather than respond to individuals. Mr. Sturgis.

MR. STURGIS: We were lucky enough to have in our group Professor McHarg, although he apologized for taking such an active part, but I think we were not the losers and so a few of these things that I will mention will be out of his vocabulary more or less.

In terms of rather practical decisions frequently made in public involving possible ecological consequences, it was a common problem in picking a school site. They are often put in swamps and frequently the information relative to that site is either not given properly to the decision making body in the town or else they ignore it in favor of some other non-ecological or non-natural consideration. This brings up the whole question of the given form of a site versus the made form--the natural versus the cultural form.

By way of illustration of the absurdity of some such decision making, Mr. McHarg mentions the Hudson River as an example. He mentioned eight or nine entirely different or distinct ecological areas up and down the Hudson River from Sandy Hook to Adirondaks or even further up. It would be absurd to build the same sort of building at one end as at the other. He made the statement that any architect, which I assume he means any professional, who did not present the survey information concerning the site, should be not only prosecuted, he should be persecuted.

And then we sort of led around again on decision making, site selection based on what the people want, and this was mentioned as being a very practical input into the whole process. That led to a discussion of to what extent the professional involved in making the survey should inject recommendations as to what the decision-making body should want and, of course, another question is to what extent the decisions might be made along other values.

Getting to the specific questions, this question of there being two areas identical, presumably with the same patterns developed, Mr. McHarg, at least, said there were no two areas identical. So, it is entirely a moot question and we dropped it.

The question of the possibilities for the decision between more than one possible use for a site, as for instance, good agricultural land on the fringe of a growing metropolitan area, led back again to what people want. It depends on the strength of the demands of the growing metropolis versus the needs for agricultural land, maybe the possibility of having agricultural land somewhere else, and it got down to a question of natural opportunities versus cultural opportunities. For the moment you could just say they exist and all right, let the people choose.

Then it got down to the business of finding out or determining what people want, and I think Mr. McHarg made a rather revealing statement. He said he himself and perhaps some of us still are or once were bleeding hearts about these issues. You fight for conservation and open space and wetlands and all the rest, and you don't seem to get anywhere. So, now, he has come up with this very cool suggestion for making surveys where you present the alternatives. Here is what the land is, and if you do this with it, then you are going to wind up with that, and how would you like it? I think as a device for professionals influencing decision makers, perhaps he has something there.

MR. BOLAN: Doctor Eisenberg:

DR. HERBERT EISENBERG: We discussed at great length the implications of Professor McHarg's presentation and what its usefulness might be in specific applications, which was something that Professor Bolan brought up at the end of his presentation.

I think it would be difficult to capsulate the discussion, except to say that it ranged all the way from whether or not it was good to plant asphalt and destroy the trees in the cities or to eliminate all cars as a beginning step in ecology, to the application of Professor McHarg's thesis to regional planning per se and that maybe it doesn't apply as much to an individual site selection.

One of the questions was whether this was an added dimension to planning or was it simply a re-statement of another kind of method of planning? Were engineers and people in this field doing this kind of thing now, but maybe not doing it in ecological terms?

Some of us felt it was an added dimension to the planning process that was taking the available information and viewing it in ecological terms. Others felt this is pretty much what is going on, although restated in a different way.

MR. BOLAN: I had the Potomac River basin paper on which we could go further into the specific nature of application and a good deal of the time was spent on this, but then we began to discuss situations where similar kinds of analysis had been used, and although they were not nearly as extensive or as skillfully done as has been done by Professor McHarg, the issue still is quite evident to us. At least in one illustration cited, the complexities of the social institutional environment, if you will, in which decision making was taking place was such that the physical, the soils, the biology had been analyzed, but the analysis wasn't put in stages of the process; certain kinds of other factors entered into the situation and were, in a sense, governing.

Then we got into other kinds of illustrations of adaptability of economic behavior, for example, which is changing rapidly and becoming less oriented to the land and more footloose. We are able to orient and locate and expect the population concentrations and things of this nature, so that we felt that what has been really given to us today was a very important element or system, if you will, in the total process of trying to understand the community of man and its problems and its possibilities. Additional kinds of systems applied and researched with equal skill and diligence were still going to be needed. We had definitely provided a substantial additional input to the process.

Now, before we open this up to general discussion, Professor McHarg has been on the receiving end of a great deal of conversation since he stopped talking an hour and a half ago, and I think it is only fair to give him some opportunity to defend himself or to attack his critics critique of critiques or clarify, explain, or do anything else he wants for a few moments. Professor McHarg?

MR. McHARG: Thank you. Of course, it is very clear to me that I am not clear enough. I am terribly sorry about that. I wish I could be more explicit.

Let me tell you some of the aspirations of this method, which I haven't spoken about at all; perhaps this is why it seems unclear. The process is a continuous one for me, and I work in an office with David Wallace, PhD., Economics, Harvard City Planner, who has worked as a planner for a long time, about twenty-five years. He has the brown finger, and I am the green planner, and we are two young associates. It is McHarg and Wallace and it is landscape and city planning, and the regional science and the architectural sciences.

So, you ask a man to speak about one part, and it is important now to say that both in the university and the office I feel myself a spokesman for a part of the planning process. I don't believe there is such a thing as a planner. There are people that contribute to the planning process as we do it now.

The first thing is, I start my way by first identifying for my clients and partners and students nature as a process. First of all, the litany of it, go through the whole bloody thing and at the end we come up with values and information on all of the natural process material which is the economic implication. So, we can make now a controlled growth model. You see, this is what the future is likely to hold for the metropolitan region, assuming the pattern in the future is substantially the same as it has been for the past.

When we have an uncontrolled growth model, this is also of value. We can propose tentative value systems, let us assume some men in this metropolitan region will value open housing above all things, and next value economic growth, and set a very high value on minimum unemployment.

Now, these are three real values and all interrelated with each other or could very well be. We have one man with one set of primary values, and another man who cares about the amenities and the water and the environment. He has one set of values, and then we ask each of them to take the demand model, satisfy the demand model and produce a form of metropolitan growth responsive to the value system they have espoused, and the priorities of it.

We have some alternatives. We can say to the society, here are the choices. If this is your value system, this is likely to be a consequential pattern of the metropolitan growth. We can examine these and see that there are some things which are compatible. In every value system there are possibilities of getting some things which are common and go through with this with a matrix and find things which are compatible with a number of the value systems, and those which are incompatible. Make the maximum number of social benefits and the maximum cost and we can get the maximum social utility solution.

It is a theoretical concept. It does work in a rudimentary way, and I think it can be made to work in a good way. Its application I have no doubt of. Its basic presumption is the information about the management, the results, and natural resources, and human resources.

Now, as to the questions themselves, obviously Professor Bolan recognized the Presbyterian, and there is a whole question here about, I think, determinism and the will, and there is no determinism and no free will somewhere between anarchy. We have the trend of the past with us; we carried the vestigal tail of the appendix, and we are with the past. They say we are linked to all life by virtually being alive. It is an open funnel, and the choice for the future is absolutely infinite, although it has to respond to the realities of the historic past. It is not either/or.

There are no two grains of sand identical or cells or organisms or species. There have never been two things identical. There are not now two things identical. There is never any reason to believe there will ever be two things identical. That which is now never has equivalency and never will be replicated. However, if we go a little more grossly into the business, we can see that where we find animals who find habitats which are similar, and animals in themselves tend to be similar, and if these animals are coexistent, then there are three possibilites. If they are cooperative or mutual, we don't have to bother with them. Neutrality means they don't interact. In many cases in ecology, if they are in competition with each other, obviously they may be similar, but one will fail, and if they are in competition, then they have got to differ. If they are absolutely identical, there is no particular advantage in cooperation. If they are, in fact, different, perform different roles, there may be some advantages in the cooperation.

I think the rest of the material is not of the same degree of seriousness. In the question of the presence of the intrinsic land uses and compatability of the planning in the use of it, the planner may have prejudices, but it seems his role is to produce evidence in such a way as everybody can view the evidence and come to the same conclusion that he proffers. This evidence which is an application of the value system and an application to an explicit response: society can choose to either accept or reject it. I have found, however, the more finally one examines things, the more discreet we are and the more opportunity there is for discrimination because the world is unique, because every area is itself, because all environments are in fact different. The discrimination of the differences is, of course, a discrimination of the opportunities and also the constraints. But I have not found even in quite a small region a place where I have been unable to make discriminations which are consequential.

It seems to me one of the terrible things architects conclude is that they really believe in artifacts. I think this is a horrifying illusion that as one looks at the things that are important, it is perfectly clear that that which endures longer is not buildings; it is life that is important and the building is only important insofar as it affects life beneficially or detrimentally.

FROM THE FLOOR: In our group there was, I think, a desire to pin down the definition of ecology. Some people have the impression that it is balance of environment as it affects men. Other people felt it is a more general consideration of the various interacting forces of creatures and life and so on. Would somebody care to comment on that?

MR. MCHARG: Yes, ecology is the study of interaction of the organisms and environment which includes other organisms.

FROM THE FLOOR: There was a point that I noted but didn't mention before, which may be a little abstract, but it has to do with decisions. It is the question of historical evidence to the consequences of un-thinking decision making with respect to ecology. The fact came out that in the areas from the Tigris and Euphrates in Rome, a great deal of the Mediterranean area was once highly forested and a great natural area and I guess most of us know what it is like now. It appears that civilizations of the past had a whale of a time consuming all the natural resources, and it came to fruition in various cultural things which we know about. Presumable, or possible the same thing is happening to us. Maybe one question is, do we care? We may still have a hundred years or so of a free ride on the resources we have, or should we work now to start the equivalent of re-forest or somehow to re-inject our natural environment into the things that we are doing?

MR. McHARG: I forgot to raise an important point: there is, of course, an enormous variability in man's environment; the stresses vary, some people can endure drinking a lot of alcohol, people who live in Denver have a life with a fairly high level of radiation, people in the Andes have chances of surviving much higher than ours, and crab grass, scorpions and cockroaches look as if they are going to survive radiation better than us for there is a variable against hydrocarbons, and so on. The only point I tried to make really is that one can look at an urban environment in terms of its fitness for life generally; that is, a normal physiological of man, and you can see that there are thresholds of hydrocarbon oxide, of nitrogen and noise and various other stresses which produce a pathology. There are environments for man, and man physically is under stress in these environments and there is nothing you can do about it. He can't solve the problems of his own hydrocarbons by any device we have, and if you live in the environment, you are subject to these stresses and the variability in response to these stresses isn't very high. As I say, there is an environment which is increasingly becoming unfit for normal physiological man, and the thing is there is not the capacity of the organism to respond to it, because we can't think of a man who is going to live with the high levels of lead and so on. So the answer to that is you have to accomplish it by changing the environment in order to suit a physiological man who is necessarily changed to meet the pathological stresses of the man-made environment. I had to mention this as a very important point.

MR. BOLAN: I am going to resist the opportunity to get the last word in here, and indicate that we are very thankful for Prof. McHarg's presentation. I want to thank you very much, too, Dick, for coming here and for making the discussion a lot livelier. (Applause)

(Whereupon, at 5:20, the workshop was adjourned.)

The sixth workshop in a series on "Environmental Design for Decision-Makers in Government" convened in the Boston Architectural Center at 2:15 p.m., April 2, 1968. Subject, "Role Playing". Group leaders: Drs. Donald A. Kennedy and Bernard Kramer. Mr. Hermann Field, Chairman, presiding.

The following is a description of what took place at this meeting.

Background information was presented by Dr. Kramer:

When we think of the city as a system, we immediately think of a fairly large number of participants in the whole system, persons with different interests, backgrounds, opinions and attitudes; and varying degrees of expertness. We think immediately of these persons working in a rather complicated way to produce the network of events and actions that make up the city. We also realize that there are some groups within the city that have divergent points of view. Frequently the problem arises as to how these groups can come to terms with each other. Sometimes groups with different interests fail to come together, to confront each other and to move with each other. The technical behavioral problem then is how to effect understanding and agreement among groups of different interests, attitudes, opinions and skills.

We propose to present a technique that we call "Conference in the Round". In this arrangement we identify three interest groups, three groups who have in varying degrees, divergent interests, attitudes and ways of thinking. A round table is set up in the middle of the room and we take a topic that these three groups have some interest in. The first group comes to the table and discusses the topic among themselves as though they were in the privacy of their own room. The rest of the audience sits around in an outer circle and listens.

The first group discusses the topic for a period of time in their own way, using their own language and ways of thinking. Then the discussion is terminated and the members of Group A return to the audience circle. Group B comes to the table and repeats the discussion on the topic from their point of view. Group C does the same.

After this explanation from Dr. Kramer, the workshop participants were invited to try the "Conference in the Round" technique.

The first question for discussion was the problem of the inner belt highway. Should it be constructed? The three groups involved in this discussion were architects, planners-administrators, and engineers. Each group discussed the problem from their viewpoint as if they were to present their findings to the Mayor. Dr. Kramer served as chairman for these group discussions.

The second question for discussion was the problem of whether or not to build a stadium in the Boston-Metropolitan area. This was chaired by Dr. Kennedy and was conducted in the same manner using two groups rather than three, and the problem was viewed from the viewpoints of Inner-Core residents and Outer-Core residents. Topics for discussion included: the need for a stadium; the locality of the stadium; who should pay for it (state, local government or private interests); and whether or not it should be multifunctional.

After this session, Dr. Kennedy discussed the reason for the use of role playing techniques. He stated that they are useful in helping people and groups to become more sensitive to characteristics about their own behavior as well as the behavior of others.

Dr. Kennedy discussed the role playing technique of role reversal, where one individual who is discussing his point of view is asked to switch roles and quote the other person's point of view, and vice versa until all points of distortion are eliminated.

Discussion ensued about the difficulty of playing someone else's role.

Dr. Kramer commented on the "Conference in the Round" technique as an activity where one group gets together and discusses its common interests while other groups listen and try to find out why that group acts the way it does. The general theme is that one should try to pay attention to the problems of finding out, understanding, and living with the point of view of others in situations requiring joint action.

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ASSESSMENT AND COMMENTS REGARDING THE WORKSHOP SERIES: THE CITY AS A SYSTEM

BY BENOIT BEGIN

Below is an assessment and comments regarding the workshop series by Benoit Begin who was a visiting associate at the Joint Center for Urban Studies of M.I.T. and Harvard at the time this program was conducted.

The selected theme, The City was to be explored in seven consecutive sessions for the benefit of some 105 participants, few of whom were registered as professional city planners; most were involved in some way or another in a wide range of planning activities, and almost all those contacted were by their occupation or profession involved in decision-making, administration, or conceptual work related to the city. It was evident from the very first workshop that the participants were aware of the differing intensities of the relationships which exist between their immediate fields of concern, those outside their spheres of interest, and the interconnections between all the various threads of the city fabric. Discussions in the workshop demonstrated that participants not only shared some feelings about the theme but that they also had an interest in becoming more articulate about it and hoped to learn of a "satisfying" rational framework that could have some bearing on their individual or institutional performance. From a limited, individual approach, the dialogue progressed toward a more objective, generic, and inclusive perspective.

In anticipation of such a reaction, the sessions were organized to foster participation by the audience and to achieve interaction with the guest speakers. The three following formats were adopted:

1) The first consisted of an "expose" by a guest speaker, lasting about an hour and a half, followed by participant discussions, in groups of about 12, in separate rooms. Each group was led by a chairman, who was to give comments and/or conclusions in a second general gathering moderated by the speaker.

2) The second format was developed to use certain techniques of group dynamics in analyzing two of Boston's controversial issues.

3) The third format, a day-long plenary session, was divided into three parts: in the first, several people commented on their respective share of responsibility in the John Hancock Project--a topical question; in the second, a chairman (one of the previous guest speakers) led a discussion during lunch to assess and explore the problem; and in the third period (in the afternoon), under the leadership of a moderator, each workshop chairman reported on the position of his group.

This scheme set the stage and the channel of procedures to achieve reactions between the discussants.

The Nature of the Theme and the Objectives

The selected theme, "The City as a System," is an emerging notion gradually being drawn from a complex reality. Theoretically, that reality could be extrapolated into a system composed of subsystems, the latter often grouped in turn into ecosystems, each functioning with a relative degree of autonomy but, overall, subjected to the others in various ways by the input and output of related subsystems in the whole matrix of the city. Conceptually, the system of the city could also be related to larger embracing systems like the metropolis, the region, the state, and so on.

Although a theoretical concept of the city as a system could be explained from a rational construct, the problem is quite different when one tries to specify the city's constituent parts and the dynamics of their respective interactions. The degree of comprehension and mastery differs greatly from one element of the spectrum to another. Some are quantifiable, others are not; some could be constructed from tangible factors, others out of conceptual intangibles, while others are made up of both. This constitutes only part of the problem; we still have to acknowledge many gaps in our understanding of the interrelationship between the elements and a great many of the respective reflex mechanisms at work when such a system is looked at in the context of the planning process--and, notably from the standpoint of the decision-making process, the strategic phase of any policy making.

However, the public decision-maker is faced not only with the inherent complexities of the city as an evolving system and the way his actions could be, or are, affected by decisions made in other systems. He is also confronted with a perpetual dilemma between two constraints: one relates to the degree of comprehensiveness of his action or policies, the other to the level at which decision making is made between the minimum and the maximum scope of interest (cost benefits, cost efficiency). Each decision- or policy-maker has to acknowledge some cognitive limits to his field of endeavor, whether it concerns the city as a whole, the functions of any sector, or the component geographical area. The same concern applies to decision-making in the whole wide spectrum between sheer utopia and platonic facts.

In sum, the workshop series was intended, implicitly at least, to help decision-makers from a wide range of fields to understand the meaning of the city as a system and its working limitations and possibilities; the immediate configuration and position of their sphere of activities within the larger matrix; the interactions and relationships between the inner and outer systems; and some indications or guidelines for the performance of their respective tasks.

The Advisory Committee of the B.A.C. therefore set itself a serious challenge, considering the background of the participants, the limited number of sessions, the restraints put on the inevitable difficulties in maintaining consistencies in the perspective, and the relationships among and the purposes of the guest speakers.

My comments so far provide the background to the assessment I was able to make. But such an experience could not be judged in a vacuum; while the staging, the scenario, the performance and, to a certain extent, the reaction of the audience could be evaluated, it was impossible, except through a superficial exchange of comments, to assess the degree of satisfaction or dissatisfaction of the people present. Some questionnaires were circulated among the participatants, but mainly they related to the mechanics of the scheme or to reactions to the conduct of the workshops. Consequently, I used in my evaluation the techniques of a free-lance drama critic, with all the intrinsic vices or virtues such techniques may have.

The Relevance and the Articulation of the Theme

There are few themes more relevant to public decision-makers, planners, engineers, and architects. This is evidenced by the growing interest, expressed in different ways, of academics, professional organizations, public administrators, and city-oriented decision-makers in general.

Few other themes could attract and serve as a common denominator for people of such diverse backgrounds as those who attended the sessions, and few subjects could involve people so deeply in a shared awareness of the present chronic urban crisis and what it entails for the future of urban society.

But on the other hand, few themes could present more difficulties for achieving the sort of objectives that had been set forth. Nevertheless, with due regard for the overall long-term impact, the Advisory Committee should be credited with insight, broadness of views, and purpose.

However, the theme, as conceived and explained earlier, was never presented and fully explained to the audience as a whole.

It could be argued that the first speaker tackled the subject from this perspective. This could not be denied. But to my understanding, he approached it from an operational research point of view. Operations research, it is now recognized, has many drawbacks, compared, for instance, to systems analysis, which is more appropriate to this sort of task. Even though the problem itself was explained with proficiency, the level of discussion was too abstract and the content was too complex to be easily grasped by the majority of the participants, people hardly familiar with the problems as presented and even less familiar with the methodology.

The group discussions which followed and the discussion at the general meeting hardly extended beyond particular and specific problems to deal with the broader and more embracing rationale of the system. The only gain one could bring away was a foggy notion of the internal geometry of the city's infrastructure.

The following workshops dealt forcefully with the elements of the system, except for the sixth one which was devoted to experimentation with the new group dynamic techniques.

The first group of discussions were in general presented by people whose competence could not be questioned and they managed to stimulate interest and imaginative, constructive responses in both the round and the plenary sessions. I could not help noticing, however, that the subject matter was isolated from the larger context, that little attention was given to the solidarity of the city's component parts. No direct attempt was made to create for the decision-makers the proper stage that would help them to gain the relevant knowledge for more efficient roles.

As to the sixth session, I consider it didactic and of little possible use for decision-makers. The organizers, unfortunately (and they could not be blamed for it), lacked the necessary perspective to orient the participants efficiently within the framework of the system.

In short, however, as good as the musicians may be, they alone do not make up an orchestra, especially when each individual performs his own melody and arrangement. The result will be several recitals, not a concert.

Summary

This experience permitted a significant number of people to become aware of the complexity of the city and the intricate interrelationships among its parts. It fostered discussions between participants, and, of utmost importance at this point, it raised many questions that remained unanswered, and which will undoubtedly call for further meetings at which there can be a broadening and deepening of the subject.

In conclusion, I consider the experience valuable and worth pursuing. Aware as I am of the tremendous intellectual resources available in the Boston area, particularly in this field, I feel confident that future programs could easily be conducted most satisfactorily, and covering a greater number of wide-ranging urban problems. Let us consider this one as a first experimental field test used to set the compass more accurately for the succeeding ones.

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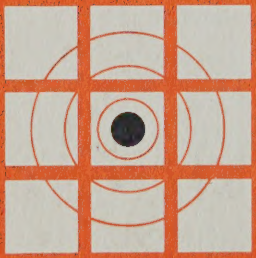

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